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VICTORIA REGIA. (VIEW OF VICTORIA REGIA LILIES ON THE RIVER BERBICE, GUIANA.)

THE

NATIONAL

ENCYCLOPÆDIA:

A

DICTIONARY OF

UNIVERSAL KNOWLEDGE

BY WRITERS OF EMINENCE IN LITERATURE, SCIENCE, AND ART.

VOL. XIII.

TRADE SOCIETIES——ZYGOPHYLLACEÆ.

LONDON:

WILLIAM MACKENZIE, 22 PATERNOSTER ROW;

HOWARD STREET, GLASGOW; SOUTH BRIDGE, EDINBURGH.

270. c. 30 399. d. 353.

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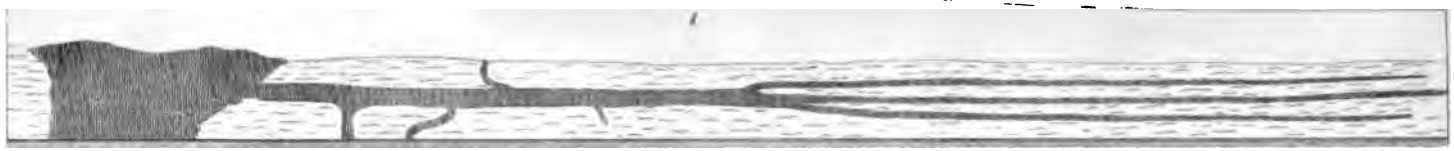
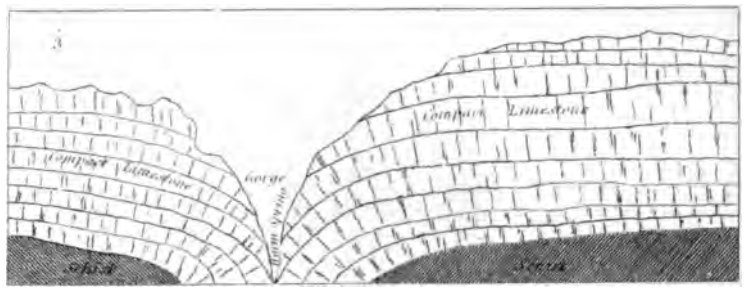
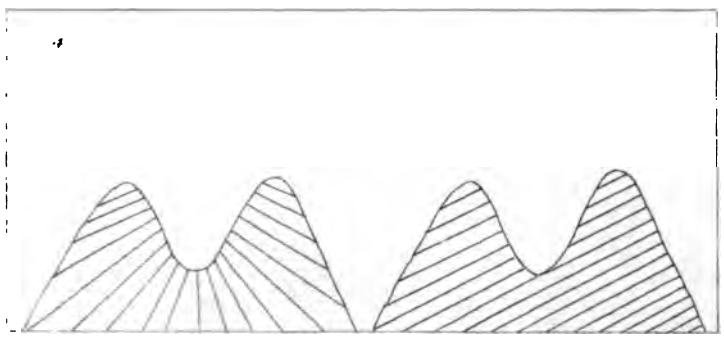


Dykes of Trap Greenrush Isle of Skia

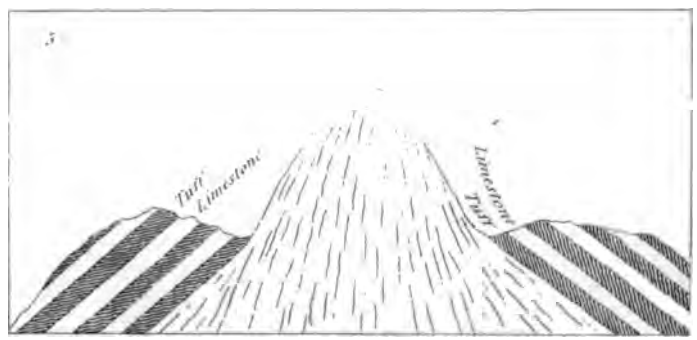
Section of the Circular Valley of Elevation Pyrmont



Section at St Paul de Fenouilhades Dept des Pyrenees Orient



Valley formed out of a Crater. *Valley formed by Denudation.*



Trachytic Dome, Gleichenburg Styria

TURBINE.

FIG. 1.—DONKIN'S TURBINE—ELEVATION.

FIG. 2.—DONKIN'S TURBINE—VERTICAL SECTION.

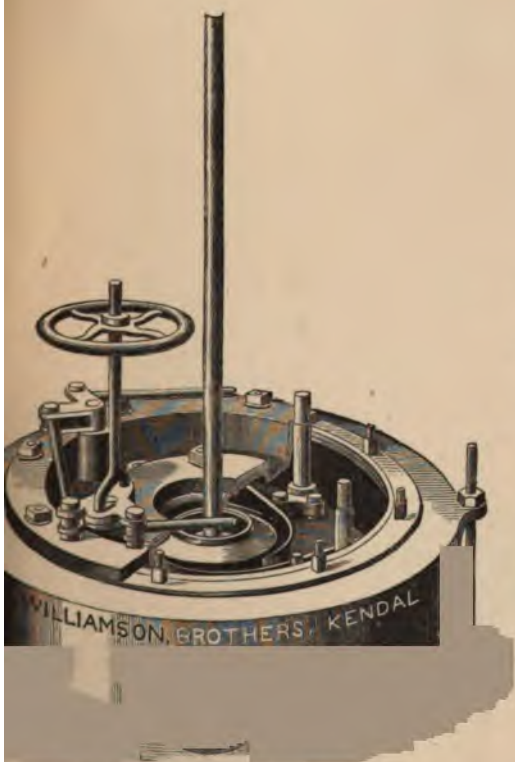


FIG. 3.—WILLIAMSON'S TURBINE.

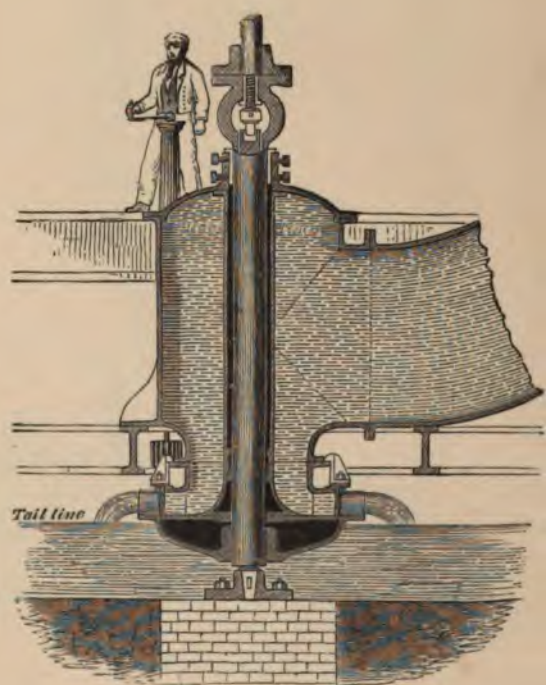
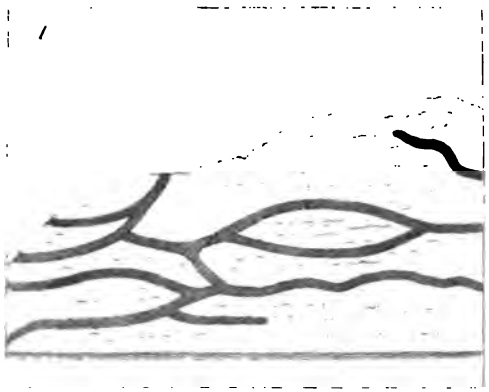
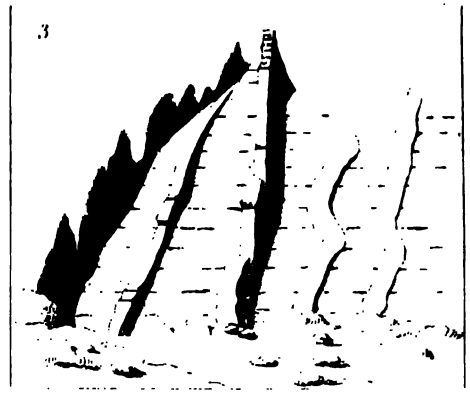


FIG. 4.—EASTON & AMOS' TURBINE—VERTICAL SECTION.

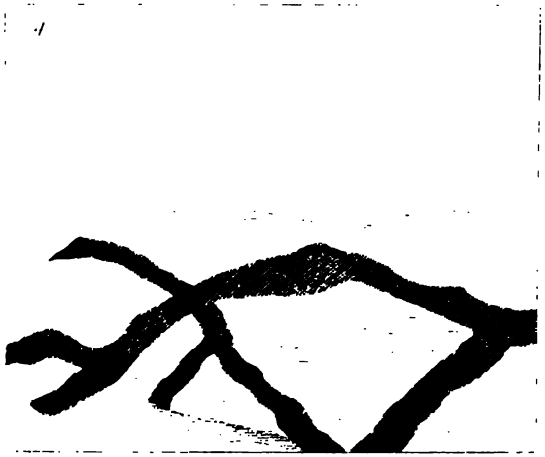


Tuff penetrated by Dykes of Shaggy Lava Stromboli

Tuff penetrated by Dykes of Shaggy Lava Stromboli



Dykes at the base of the Serre del Solfizio, Etna

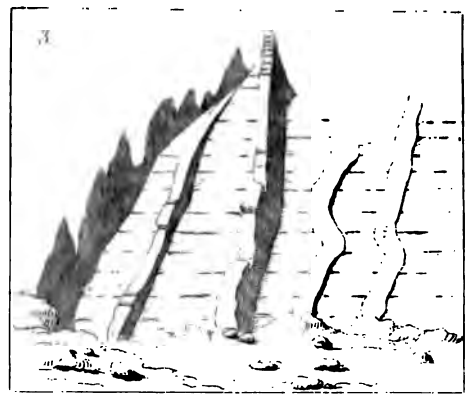


Dykes of Lava, Ponte di Caimento

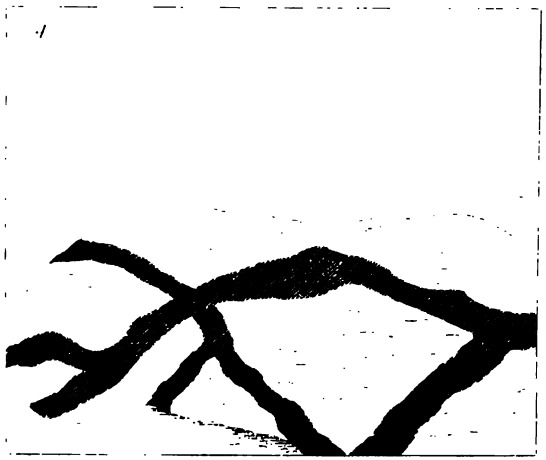
Dykes of Monte Somma, Vesuvius

Tuff penetrated by Dykes of Shaggy Lava Stromboli

Tuff penetrated by Dykes of Shaggy Lava Stromboli



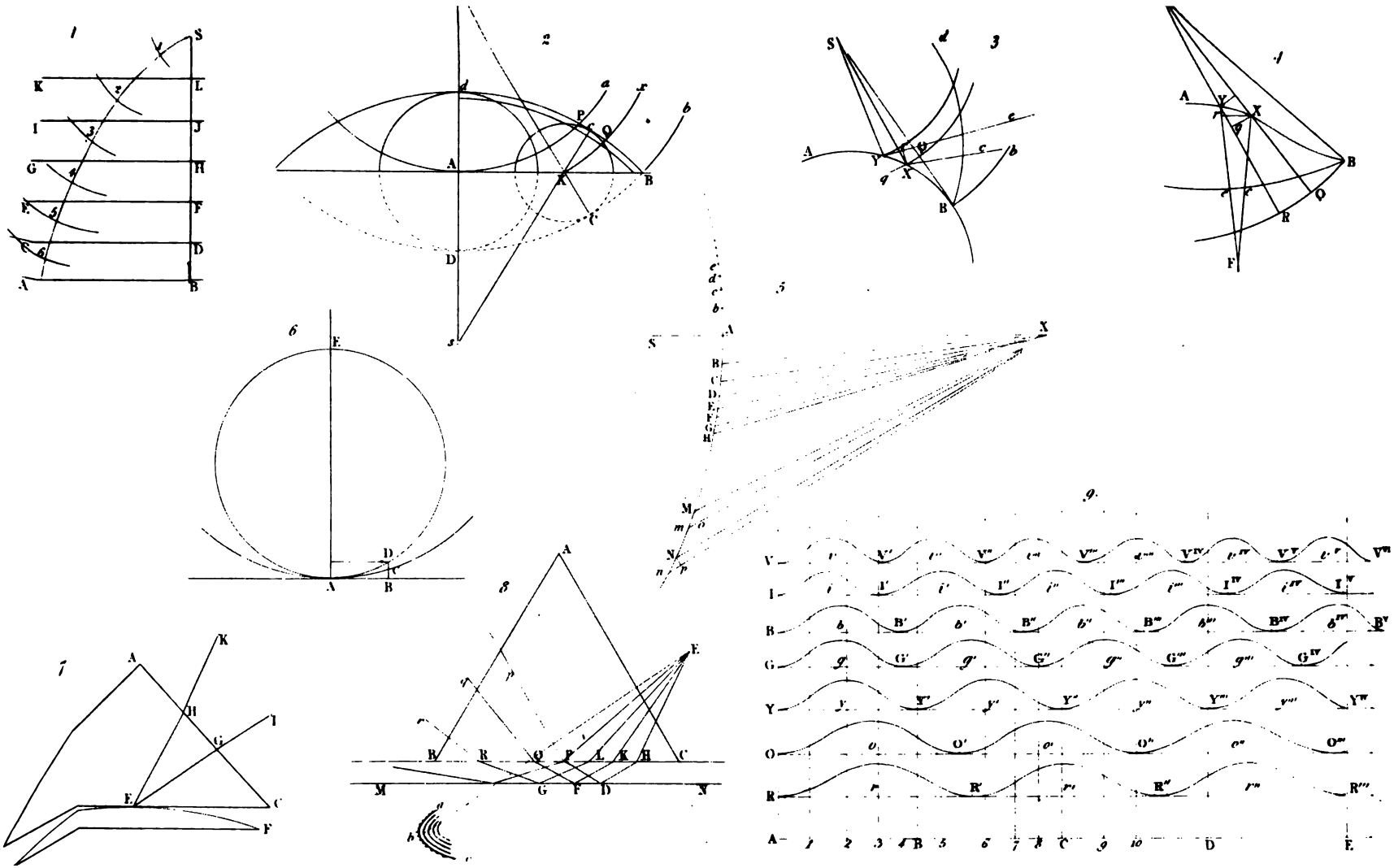
Dykes at the base of the Serre del Solfizio. Etna



Dykes of Lava. Punto di Guamento

Dykes of Monte Somma. Vesuvius

dot B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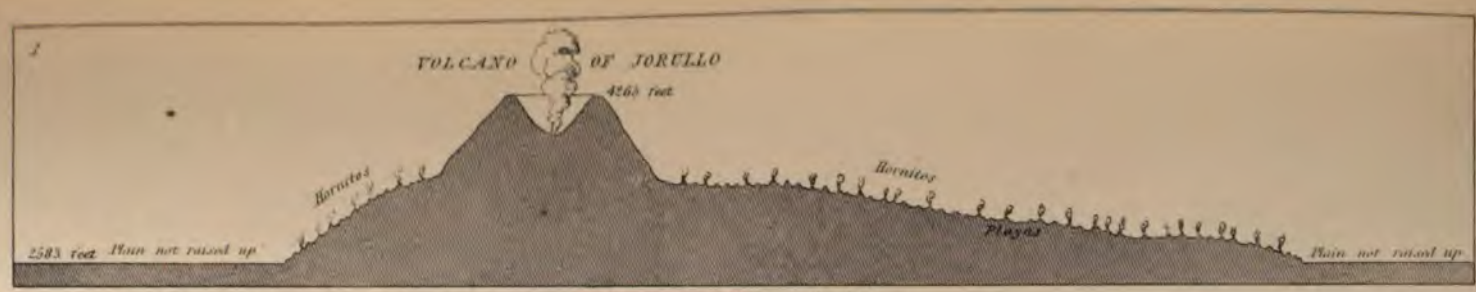


Section of Jorullo and the Malpays.

View of the Volcano of Jorullo. Mexico.

Crater of Vandama Island of St Canary.

Cone & Crater of Barren Island Bay of Bengal.

Vol. B3

Section of Jorullo and the Malpays.

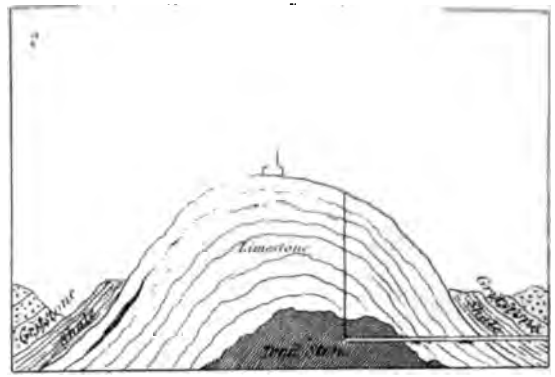
View of the Volcano of Jorullo Mexico.

Crater of Vandama Island of G.d Canary.

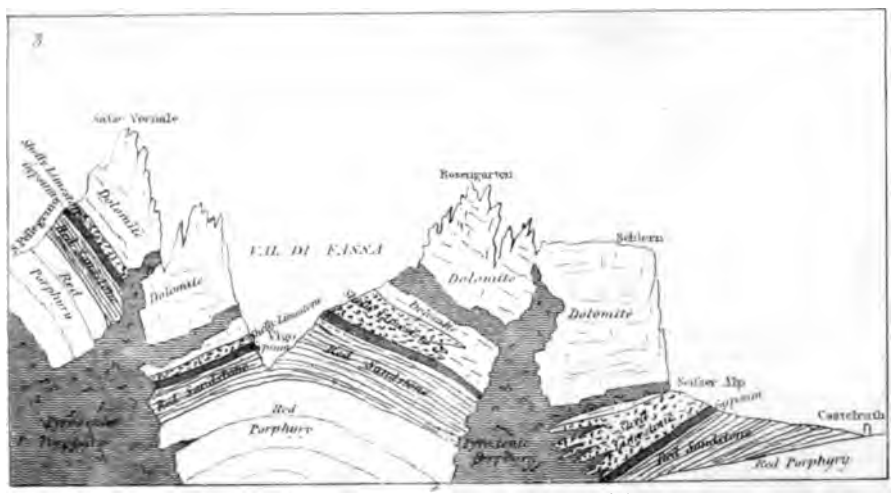
Cone & Crater of Barren Island Bay of Bengal

Trachytic Hills near Clermont in Auvergne seen from the Puy Chopine

1 *Grand Sarcoui* 4 *Puy de Dome* 7 *Grand Suchet*
2 *Puy Pariou* 5 *Petit Suchet* 8 *Puy de Come*
3 *Petit Puy de Dome* 6 *Cheronn*



Section of Crich Hill near Matlock



Section of the Mountains in the Val de Fassa

Landskrid a Mountain of Dolomite in the Valley of Gröden Tyrol

1 *Conical Hill of Dolomite* 3 *Rocksteen or Alpine Limestone*
2 *Cycas Belonging to the* 4 *Red Sandstone*

VULTURE.

Gypaetos Barbatus. Bearded Vulture.

Vultur Monachus. Arabian Vulture.

WATER METERS.

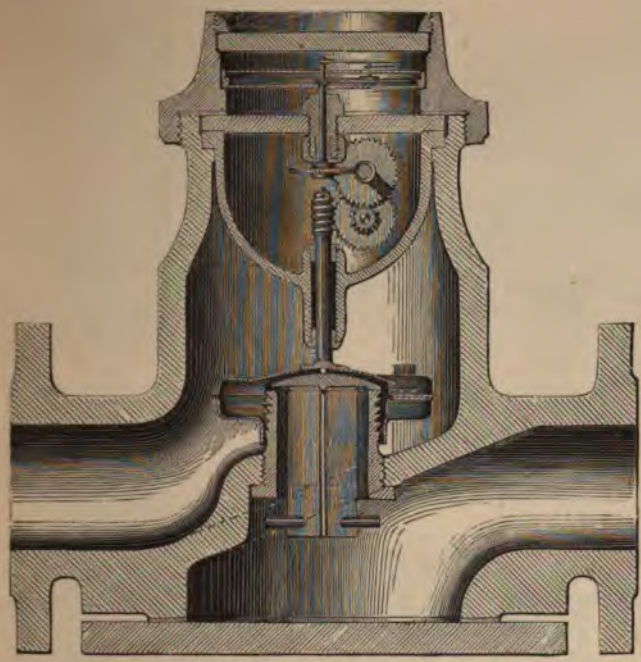


FIG 1.—SIEMENS' WATER METER—VERTICAL SECTION.

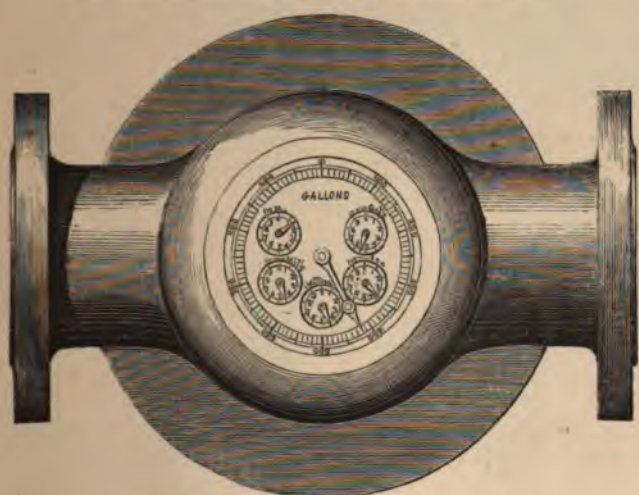
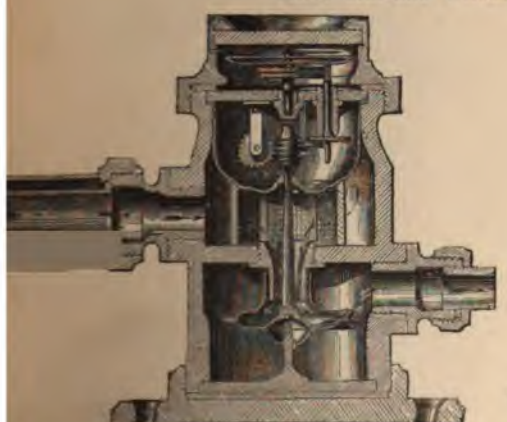


FIG. 2.—SIEMENS' WATER METER—PLAN



3.—SIEMENS' & ADAMSON'S WATER METER—
VERTICAL SECTION.

FIG. 4
SIEMENS' WATER METER—
PERSPECTIVE VIEW OF DRUM.

FIG. 5
SIEMENS' WATER METER
—SECTION OF DRUM.

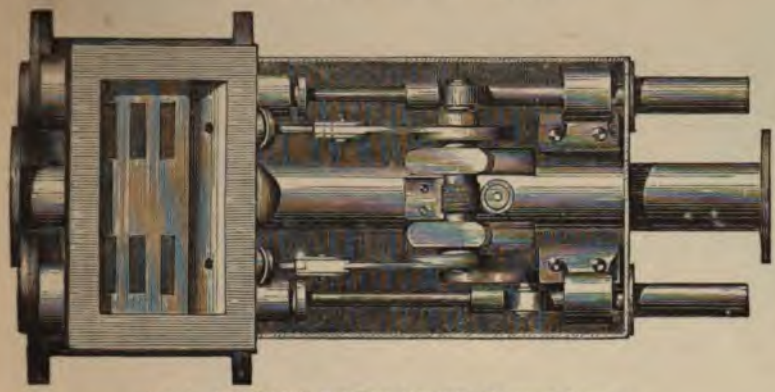


FIG. 1.—DUNCAN'S WATER METER—VERTICAL SECTION.

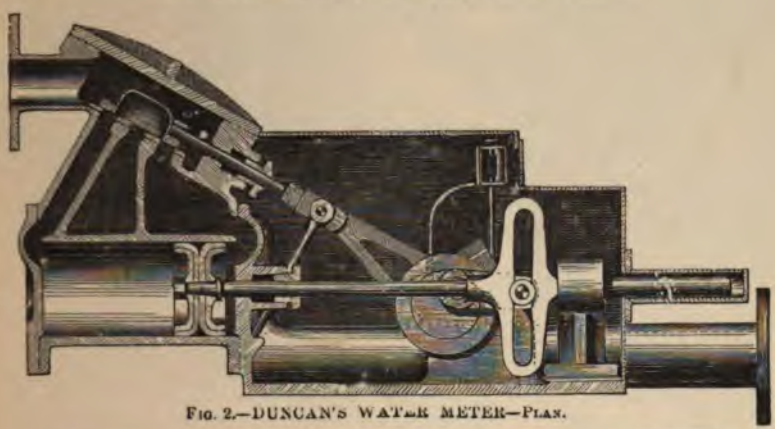
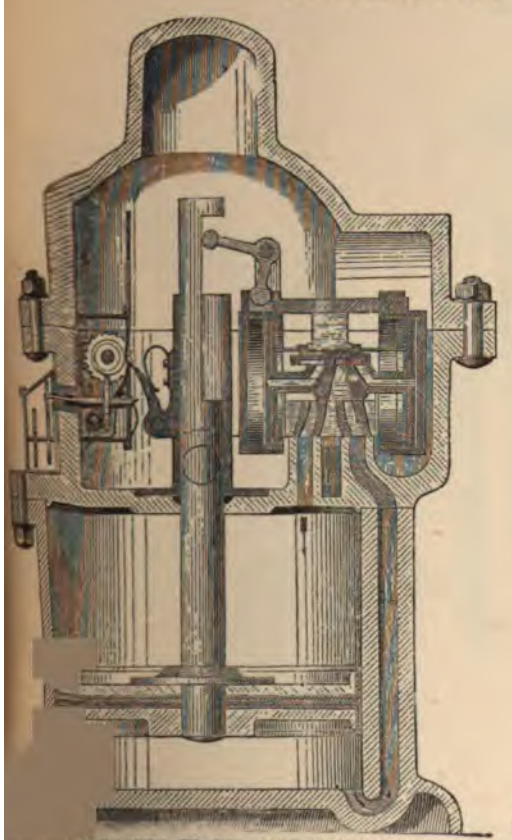


FIG. 2.—DUNCAN'S WATER METER—PLAN.



—MANCHESTER WATER METER COMPANY—
VERTICAL SECTION.

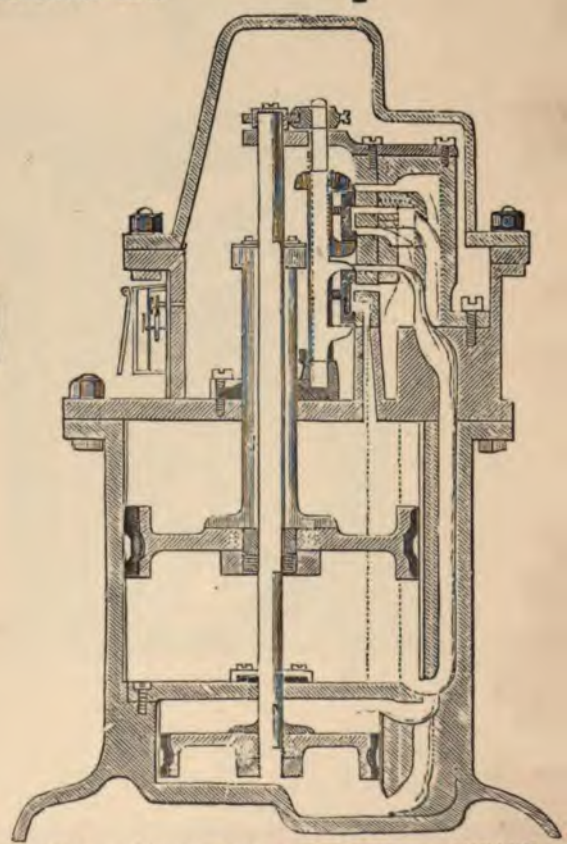


FIG. 4.—MANCHESTER WATER METER COMPANY—
VERTICAL SECTION.

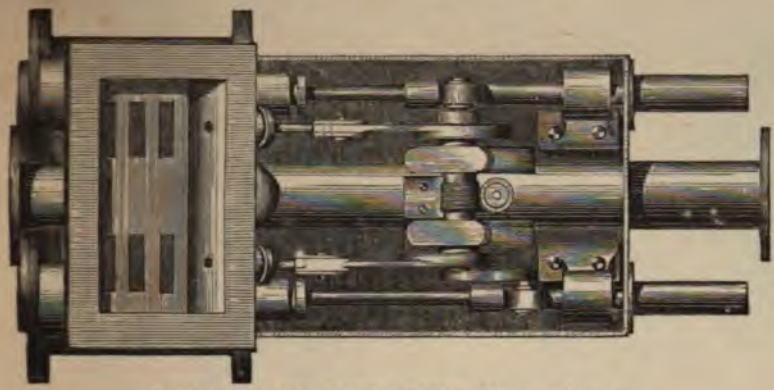
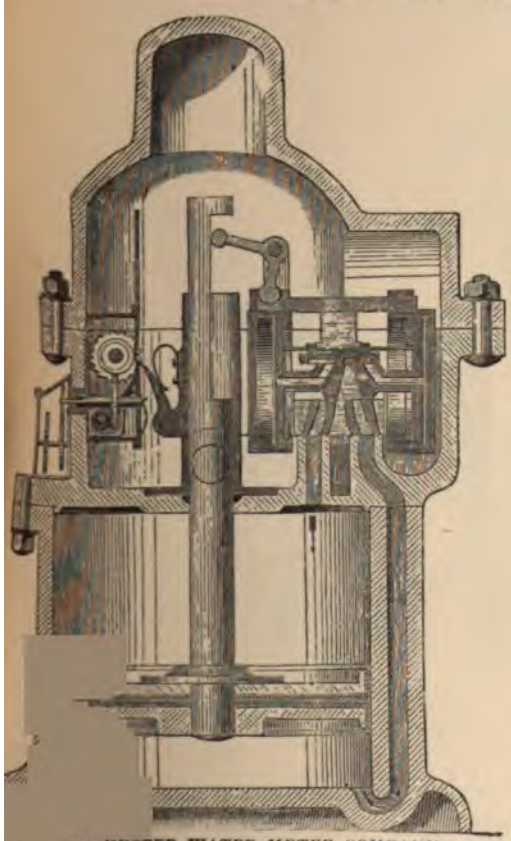


FIG. 1.—DUNCAN'S WATER METER—VERTICAL SECTION.

FIG. 2.—DUNCAN'S WATER METER—PLAN.



—MANCHESTER WATER METER COMPANY—
VERTICAL SECTION.

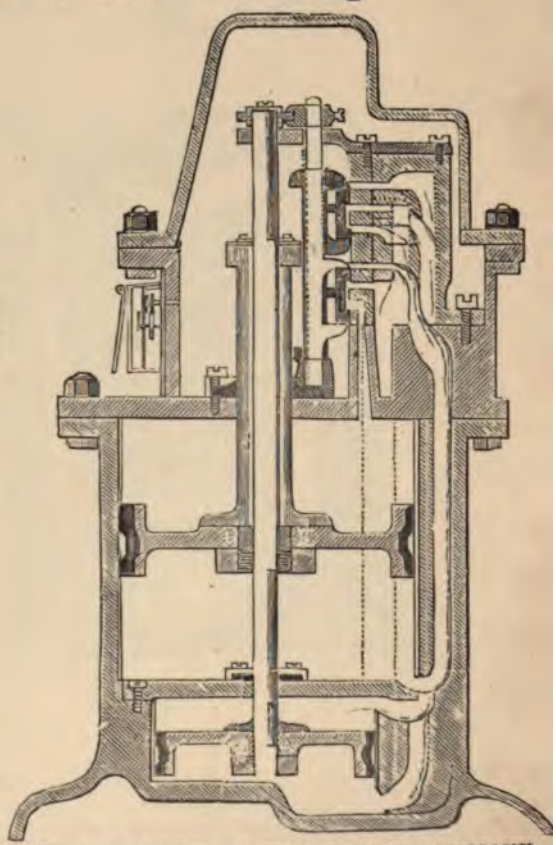
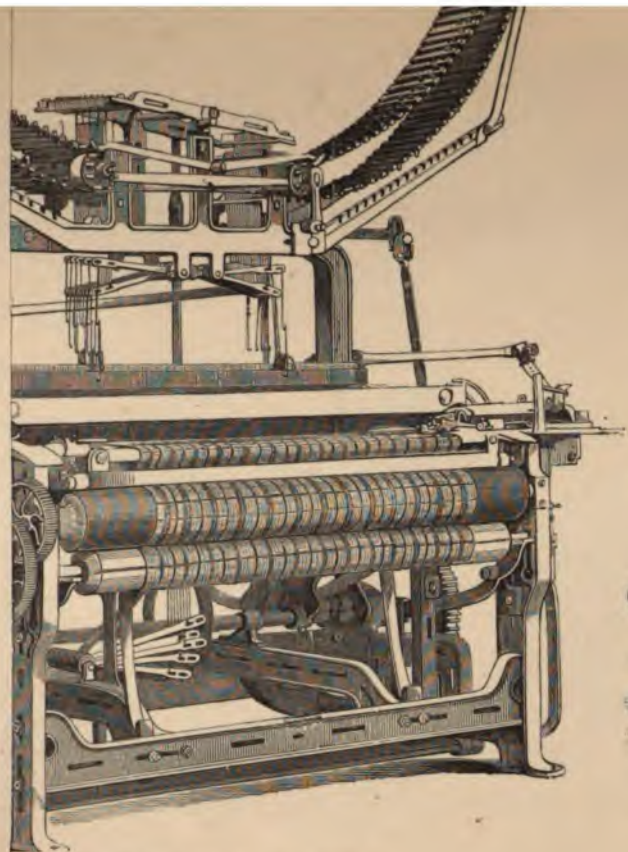


FIG. 4.—MANCHESTER WATER METER COMPANY—
VERTICAL SECTION.



CKINSON'S 37-INCH REED SPACE LOOM.

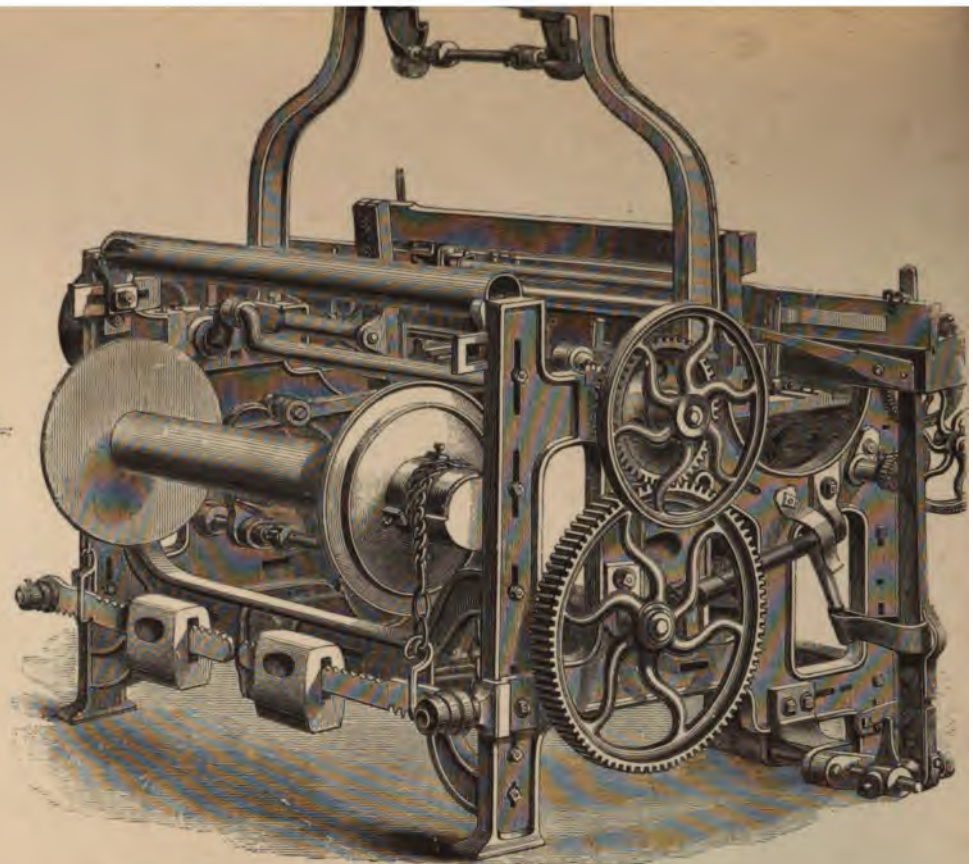


FIG. 2.—PLATT'S POWER LOOM FOR PLAIN WEAVING.

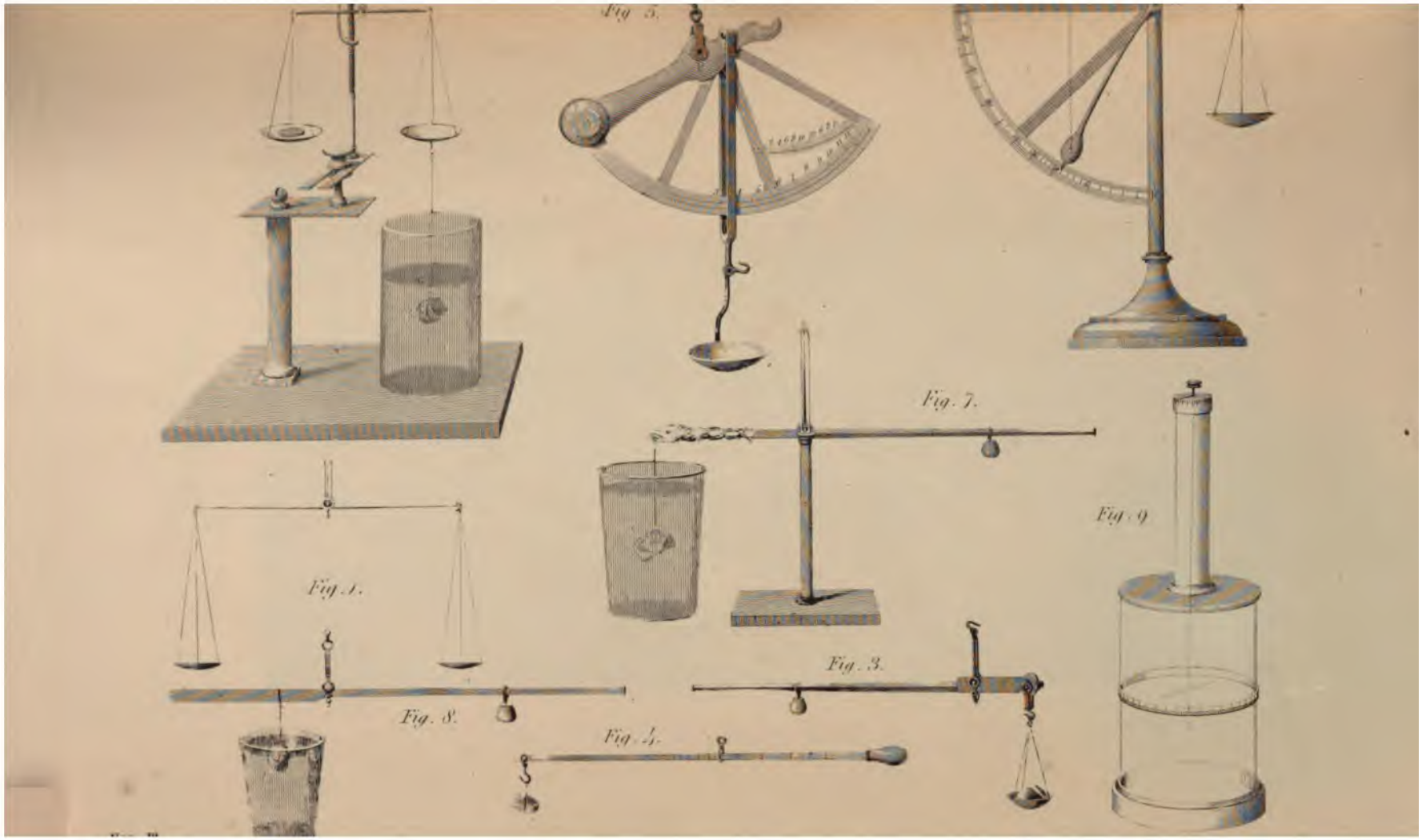


Fig. 5.
Fig. 7.
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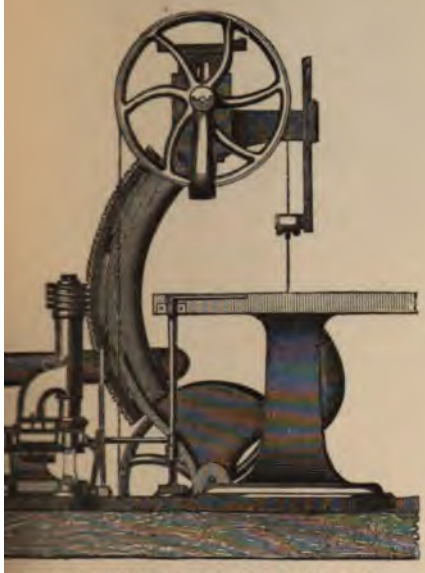
Fig. 3.
Fig. 8.
Fig. 4.

WELLINGTONEA.

WOOD MACHINERY.



1.—GREENWOOD & BATLEY'S BAND SAW.

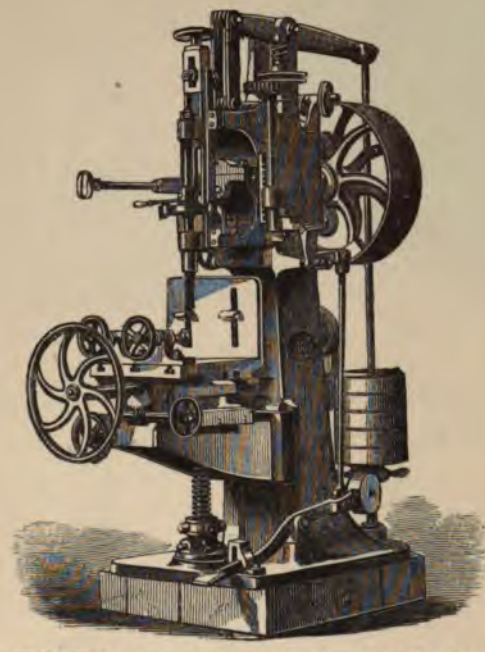
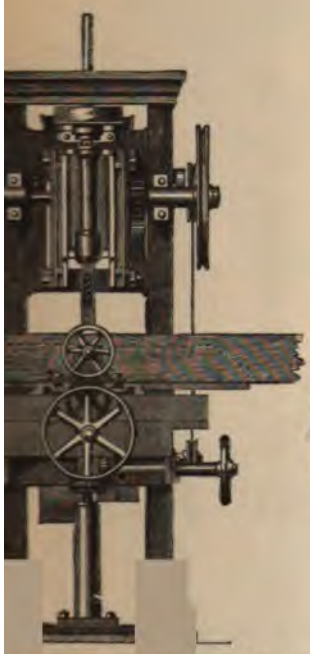


FIG. 2.—GREENWOOD & KINDER'S WOOD-MORTISING MACHINE.



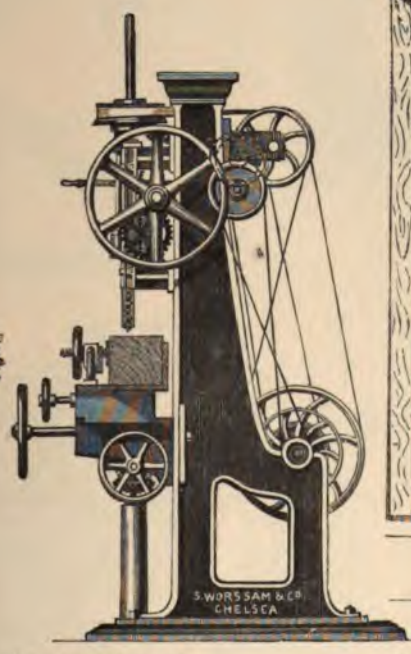


FIG. 3.—WORSSAM & CO.'S MORTISING MACHINE.

FIG. 4.—POWIS' MORTISING MACHINE.

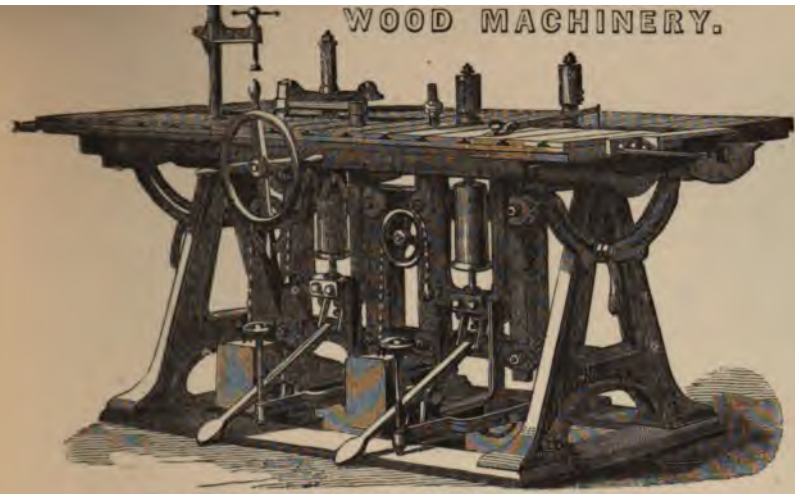


FIG. 1.—KINDER'S UNIVERSAL WOOD-SHAPING MACHINE.

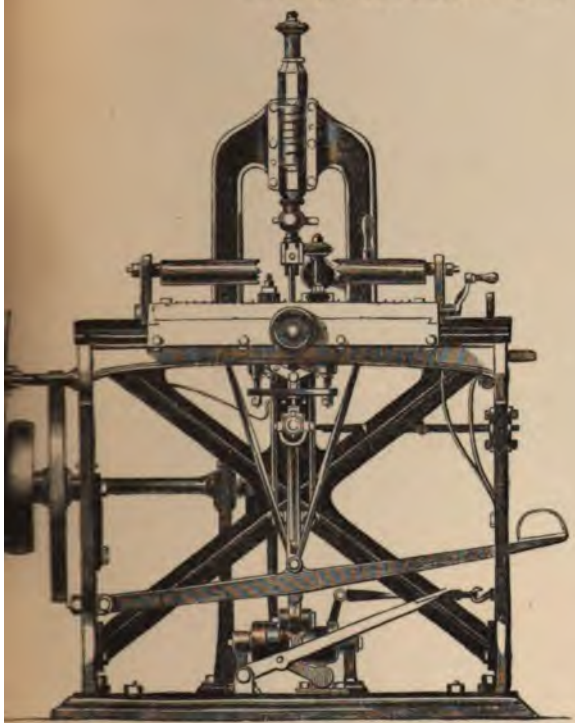


FIG. 2.—WHINE'S DOVETAILING MACHINES.

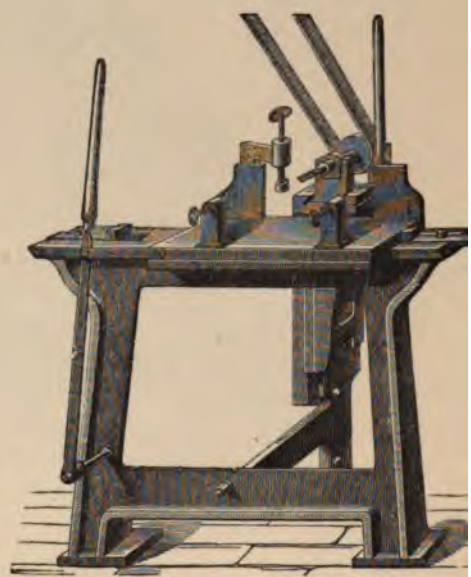


FIG. 3.—BERNIER & ARBEY—MORTISING TOOL.

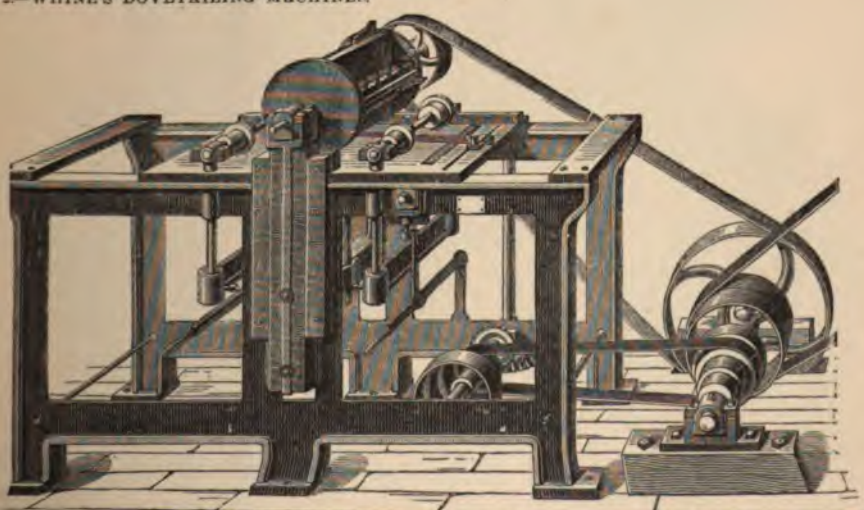


FIG. 4.—BERNIER & ARBEY—MACHINE FOR STRIKING MOULDINGS.

WOOD MACHINERY.

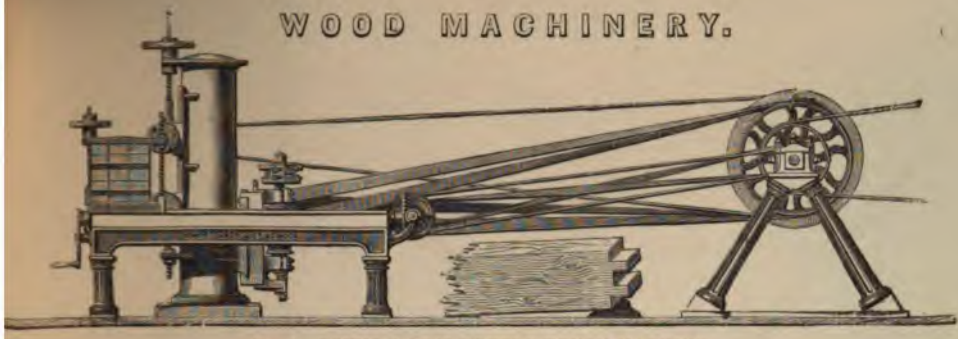


FIG. 1.—POWIS & CO.'S DOUBLE TENON MACHINE.

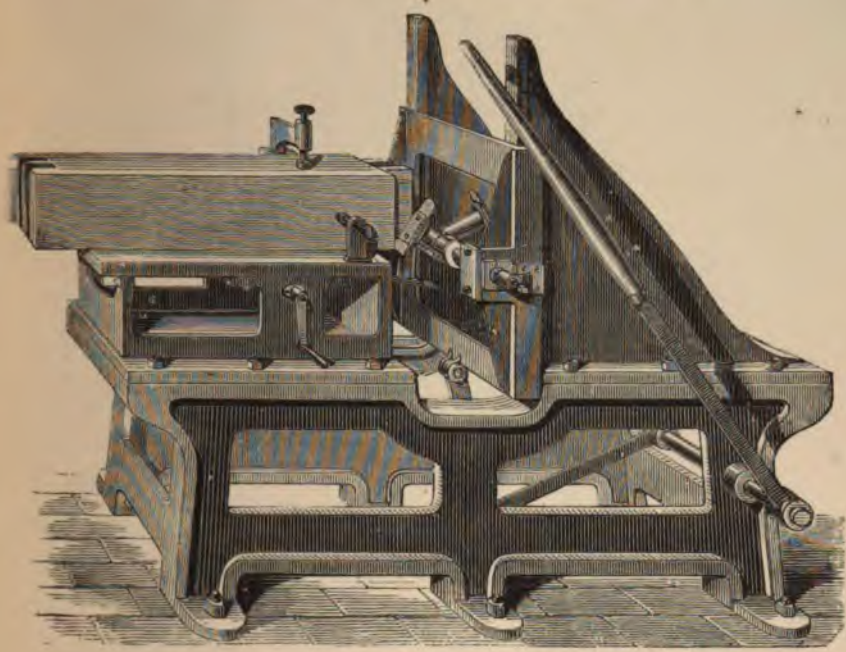


FIG. 2—BERNIER & ARBEY'S DOUBLE TENON MACHINE.

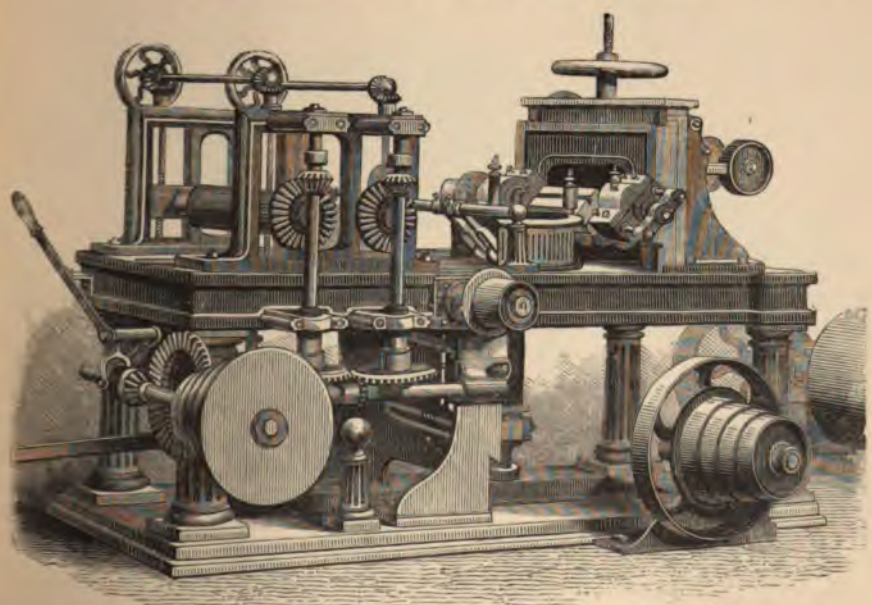


FIG. 3.—POWIS & CO.'S COMBINED MACHINE FOR PLANING, EDGING, TONGUEING GROOVING, AND MOULDING.

WOODPECKER
PICUS

P. Tridactylus. *Southern three-toed Woodpecker.*

2

Picus Martius.
Great Black Woodpecker.

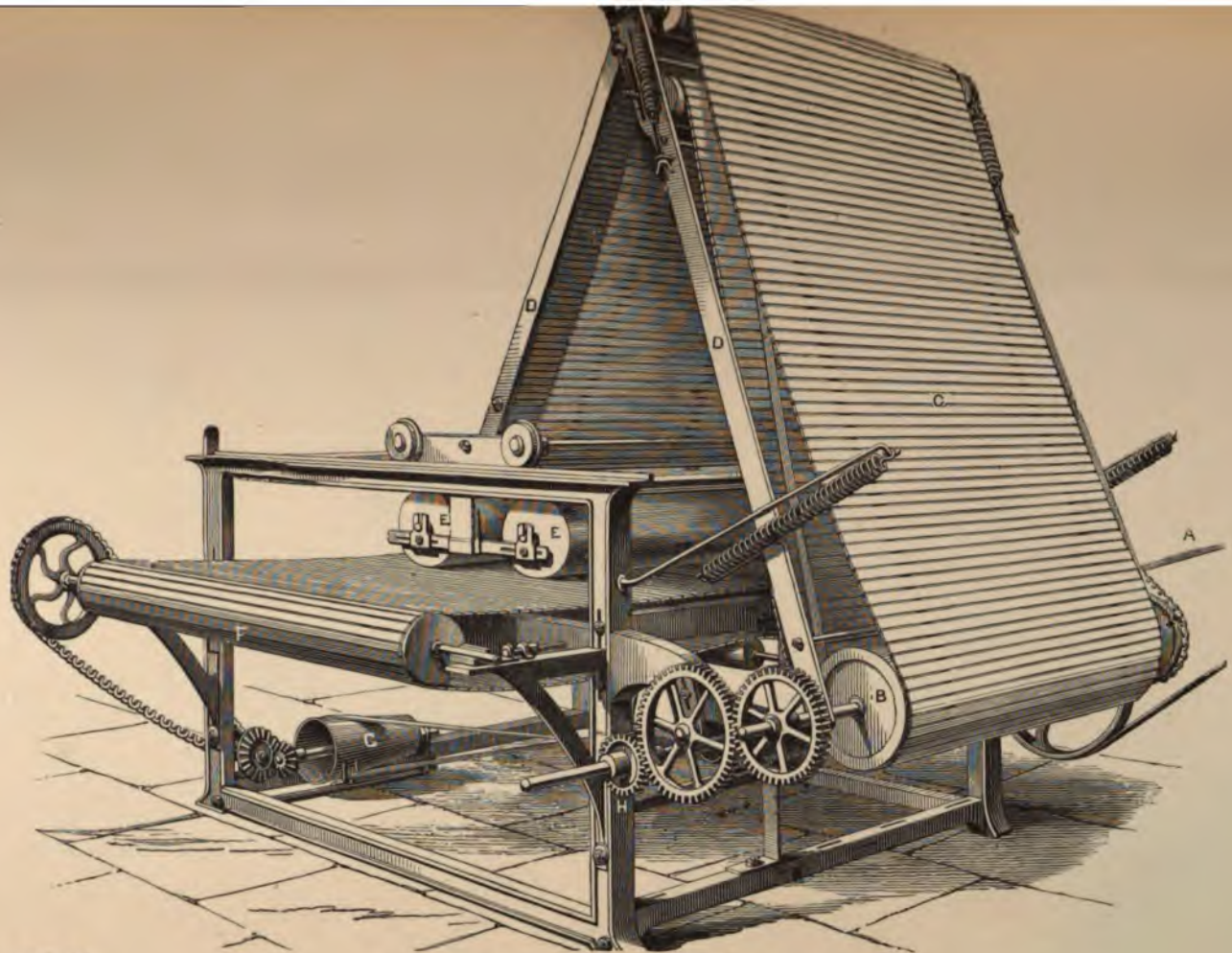
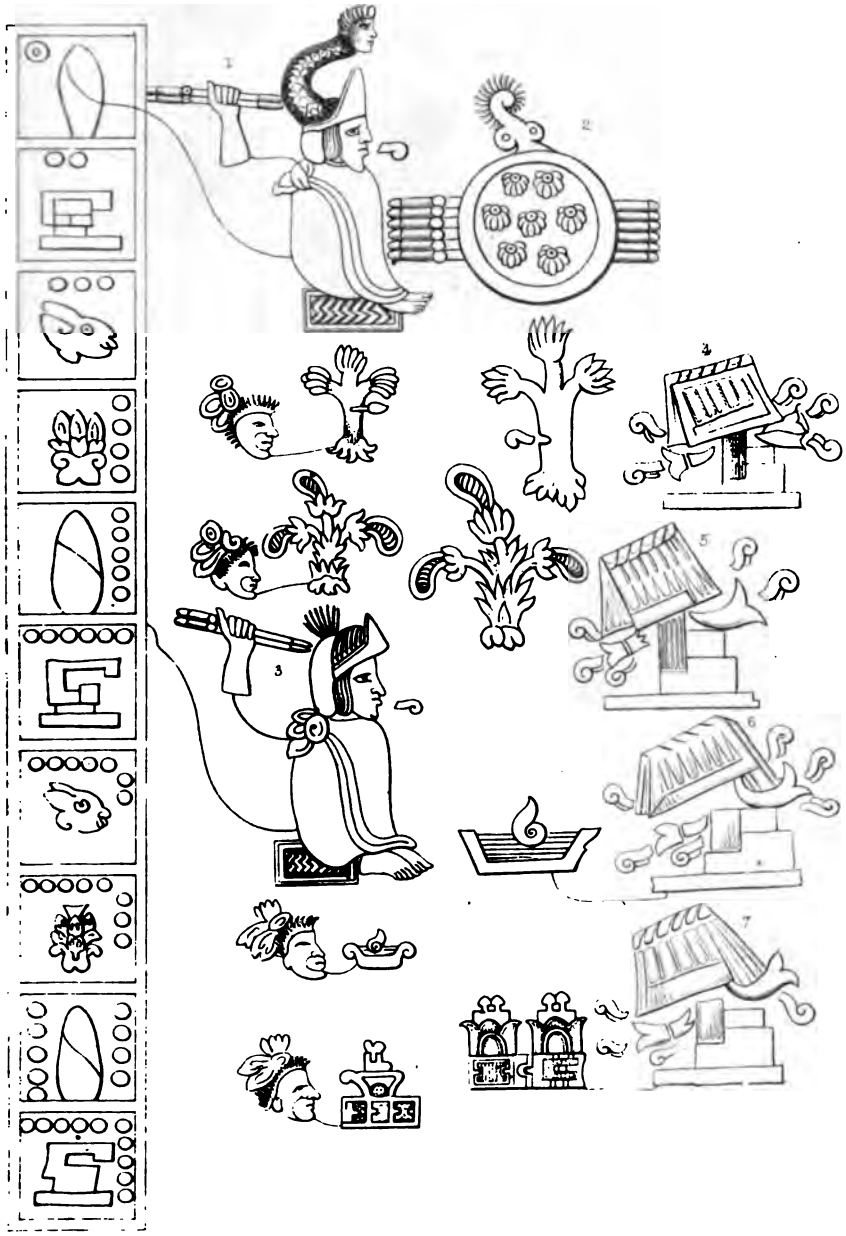


FIG. 1.—FERRABEE & CO.'S WOOL LAP MACHINE.



EGYPTIAN HIEROGLYPHIC WRITING.

PLATE 2.

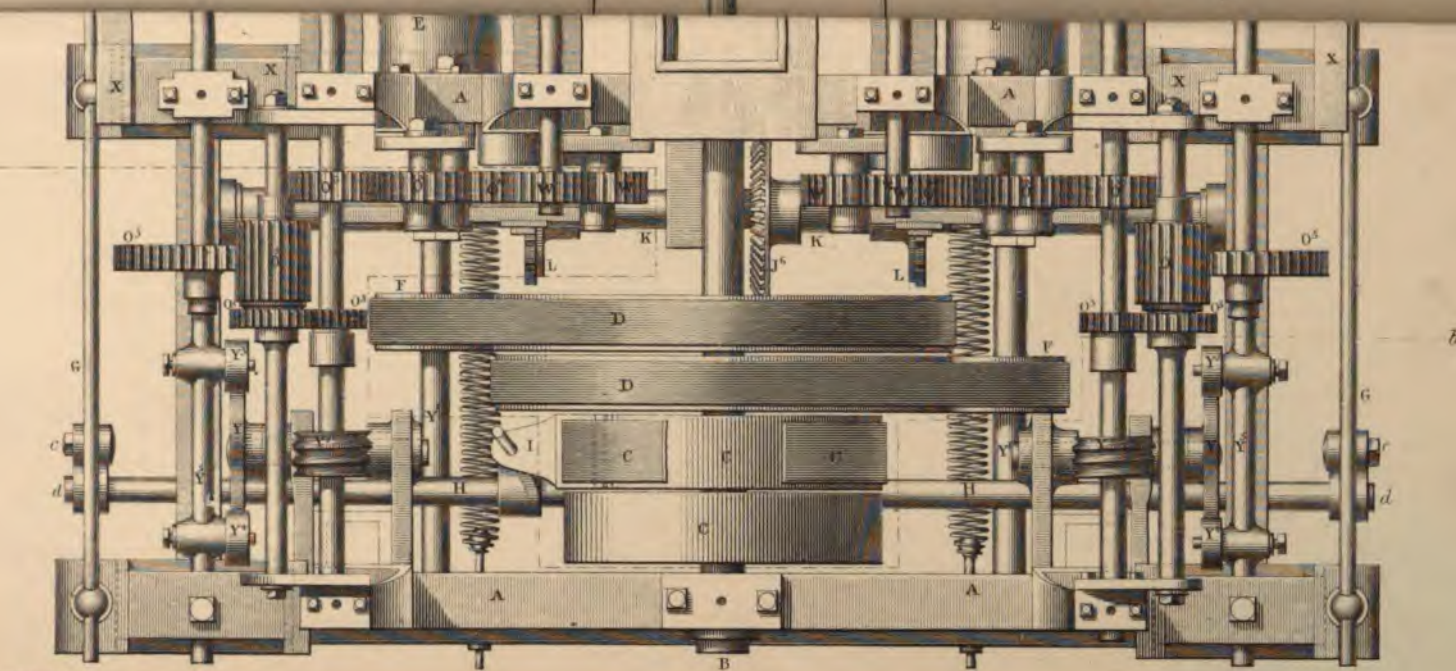
16TH CENTURY B.C.

YARN.

MACHINERY FOR OVERTWISTING YARN

BY MESSRS ROBERT SMITH & SON, STIRLING.

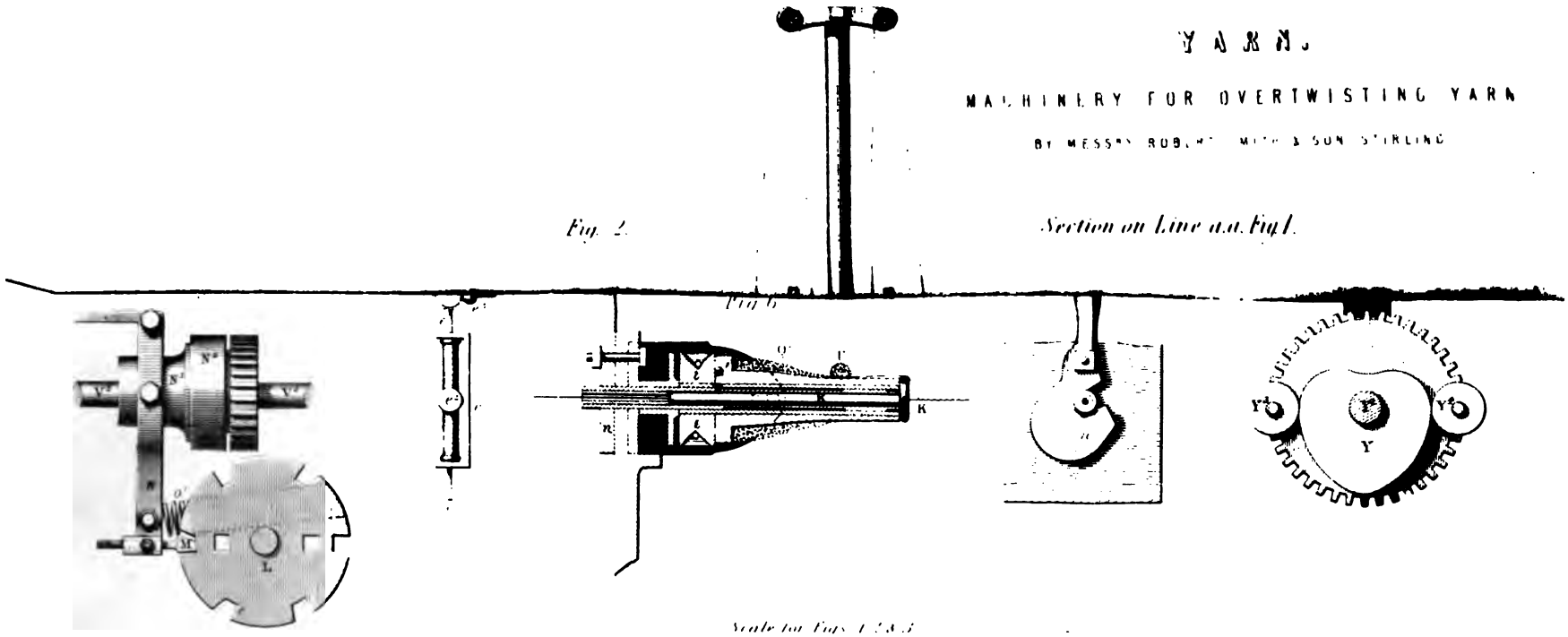
Section on Line b b, Fig 1.



YARN.

MACHINERY FOR OVERTWISTING YARN

BY MESSRS ROBERT MILL & SON STIRLING



Pl. B

THE

NATIONAL ENCYCLOPÆDIA:

A DICTIONARY OF

UNIVERSAL KNOWLEDGE.

TRADE SOCIETIES.

TRADE SOCIETIES or **TRADES UNIONS** are societies composed of working men, each society comprising only those who are employed in some particular business, or in some special department of a business. Thus masons, carpenters, tailors, hatters, in fact almost every class of labourers, have their own trades union. It often happens that in the case of a restricted branch of industry, all those who are employed in it, in different parts of the country, belong to one central society, the management of which is in London. But when the industry is extensive, numbers of these societies are established in different parts of the country. For instance, the masons in almost every large town have a trades union of their own, which, as far as management is concerned, is independent of any central authority. A certain correspondence is kept up between these different societies, and occasionally they consult together as to the course of action which ought to be adopted in certain junctures. But the masons who belong to a union in London would not consider themselves bound to adopt any measures recommended by the masons' union in Glasgow. There always exists a certain feeling of sympathy between the workmen in the same employment who happen to belong to a trade society; and if, for instance, the masons who were union men happened to be out of work in one locality, their fellow unionists in other parts of the country would feel it their duty to assist them by subscriptions. This feeling is also often manifested between unionists of different trades, especially in cases of strike.

Trades unions serve two distinct purposes. In the first place they perform the ordinary functions of a friendly society, each member subscribing a certain sum weekly to a common fund, and in return for this, an amount is each week paid to him if he is thrown out of employment, either by dulness of trade, or by illness. When a member dies his family receives a sum to defray the cost of the funeral, and to cover other expenses which may have been incurred during his illness. [FRIENDLY SOCIETIES.] Unfortunately, the registrar of friendly societies refuses to enrol or register trades unions, conceiving their ulterior object (viz., keeping up and regulating wages) to be beside the purposes of a friendly society, and contrary to sound policy. The very existence, even, of trades unions is not recognized by law; nor will the courts extend to them the protection to which all other benefit societies are entitled under the Friendly Societies Act. This was exemplified in a recent (1867) case tried in the law courts. An information was laid by the president of the Bradford branch society of the United Order of Boilermakers and Iron Shipbuilders, on behalf of the society (a copy of whose rules had been duly deposited with the registrar of friendly societies in England, pursuant to statute), charging the respondent, a member of the society, with having certain moneys of the society in his possession, and unlawfully withholding the same, contrary to 18 & 19 Vict. c. 63, s. 44. The charge was fully proved.

It was contended for the respondent that the society was not within the Act quoted, and further, that it was a society established in restraint of trade, for purposes which are illegal, being against public policy; and that the society was an organization for the encouragement of strikes.

The justices held that the objections urged on behalf of the respondent were valid, and dismissed the complaint.

The question was whether this decision, upon the facts and grounds previously stated, is or is not erroneous in point of law.

It was argued in the Court of Queen's Bench that many of the rules were strictly for benevolent objects within the Act; that the rules relied on by the respondent were not sufficient to take the society out of the scope or benefit of the Act; and even if they were void as in restraint of trade, that would not render the purpose of the society itself illegal.

The lord chief-justice and his three colleagues, however, held that the decision of the magistrates was perfectly correct; that the very purposes of the existence of the society were not merely those of a friendly society, but to carry out the objects of a trades union; that the rules of the society certainly operated in restraint of trade, and were so far illegal, that if an action were brought to enforce a civil right in respect of any of them, they would be held not enforceable at law. In the same sense the society was not 'for a purpose which is not illegal,' and so not within the Act. Therefore, for those two reasons he held it was not within s. 44 of 18 & 19 Vict. c. 63. First, because it was for a purpose not analogous to that of a benevolent or friendly society, such as was mentioned in s. 9; and secondly, because those rules, although they may not be illegal in the sense of bringing the parties to them within the criminal law, are in restraint of trade, and so far illegal.

The following statistics of the Amalgamated Society of Engineers gives an insight into the working of a most extensive organization, formed entirely of one of the best-paid bodies of workmen in the country, and proves that

the objects which are sought to be obtained by friendly societies, are equally well accomplished by trades unions.

The society was formed in 1851 of a number of societies which had previously existed, and in 1866 it numbered 33,600 members, with an annual increase of 2000 or 3000 a year. There are 208 branches—namely, in England and Wales 238 branches, having 27,856 members; in Scotland, thirty-three branches, having 2216 members; and in Ireland, eleven branches, having 1371 members. In the British colonies there are fourteen branches, having 626 members—namely, in Australia, Canada, Malta, New Zealand, and Queensland. The United States have eleven branches, with 498 members. In France there is only one branch, having thirty members. All these branches are governed by one code of rules, and the members of the foreign branches are principally Englishmen. Those in France are all Englishmen. Each member pays 1s. a week, and the society has now a fund in different banks, in round numbers, of 140,000*l.* The annual income was 86,895*l.*, made up, besides subscriptions, of entrance fees, each member having to pay an entrance fee varying from 11s. to 3*l.* 10s. The expenditure was 49,172*l.*, the heads under which it was distributed being—members out of employment, 14,076*l.*; sick members, 13,785*l.* 14s. 9d.; superannuated members (members who are 'too old to gain the ordinary rate of wages at the trade' being allowed 7s. to 9s. a week each), 5184*l.* 17s. 4d.; on the deaths of members and members' wives, 4887*l.*; and the sum of 1800*l.* among eighteen members who met with accidents and were unable to follow their ordinary occupation.

But a trades union is always something more than a friendly society; its chief purpose is generally to organize the workmen of a particular trade into a combination sufficiently powerful to enforce various regulations, both upon masters and men. The objects of the unions usually are—increase of the rate of wages; limitation of the hours of labour; restriction of the number of apprentices; prohibition of piecework, overtime, and the employment of non-union men.

With respect to the increase of wages, there can be no objection to a workman peaceably attempting to get as much as he can for his day's labour; that effort is made by all classes in society who work for their subsistence. Besides, his employer will always as a rule give him as little as he can. And no one can deny that he is equitably entitled to defeat all efforts such as these.

The desire to reduce the hours of labour is also a natural and honourable one, and is shared by all classes of the community. The endeavour to restrict the competition of labour by limiting the number of apprentices, exerts a direct influence to raise the wages paid in that particular branch of industry, but is indefensible upon any ground of public policy or justice. The prohibition of overtime and piecework is intended to provide for the employment of a larger number of individuals; but this is done to the detriment of the skilful and industrious workman, who is thereby placed on an equality with the unskilled and idle. Great efforts are made by trades unionists to make the union as universal as possible, and the means employed for this end are, first, by forbidding unionists to work with non-unionists, and secondly, by intimidation, including not only personal violence and injury to property, but all social modes of discountenancing men who keep aloof from the unions. It frequently happens that the members of these societies will not continue to work if a certain machine is used, the employment of which they consider will be detrimental to the labourer. Any manager or foreman who, by a strict discipline or otherwise, may render himself objectionable to the union, is at all times liable to be driven from his situation by a strike of the men.

It may be asked, How can these trade societies exercise the influence they do, when every one is aware that the coercion they practise is not based on any legal sanction? No one can doubt that the members of a trades union commit a criminal act, if they attempt in the slightest degree to interfere with any individual who may not belong to their society. It would therefore appear that *social terrorism* is the source of their power; for although trade outrages resulting in a destruction of life and property are exceptional, yet a non-union man is subjected to so many petty annoyances that his life not unfrequently becomes a burden to him; and his employers are coerced in a similar manner if they do anything contrary to the rules of a trades union.

From the time of Edward III. to that of George IV. severe laws against combinations of workmen to raise wages were on the statute books of England, but in 1824 they were repealed. [Combination Laws.] The trades unions have always ready at hand the combination necessary to enforce their demands; hence it has come to pass that they are constantly connected with strikes. The trades unions have, in fact, endeavoured to regulate wages, and they apply their organization to compel employers to agree to their demands. If, for instance, it is proposed to reduce the wages in some particular branch of industry where the majority of the men employed belong to a trade society, then, if the leaders of the society consider that the reduction ought not to be made, they issue an order that work should be discontinued rather than that the reduction should be accepted. If the reduction is still insisted on by the employer, the immediate consequence is a turn out of the workmen, or in other words, a strike. Such a combination as a strike requires cannot exist unless the workmen submit to be governed by an organization. The trades unions supply this organization, without which there cannot be complete unity of action.

In the article Strikes and Lock-outs we have fully discussed the question whether combinations of workmen can raise wages; and from the former part of this article it will be seen that trades unions, apart from strikes, have a noble mission in the world. Their proper function is to maintain the unemployed, and to equalise the pressure on the labour market by supplying its members with the means of travel. They are in truth friendly societies. But their wonderful organization gives great power to the workmen as a body, and supplies the combination necessary for showing that power. Many British societies are in correspondence with similar societies abroad. Thus their influence is immense, and when any of the union workmen are on 'strike' or 'locked out' in any part of the country, or even of the world, their fellow unionists assist them by subscriptions. Of late years many different trades have amalgamated their unions, and now possess enormous funds. 'Unity is strength.' A combination of employers in any given trade may be stronger than the workmen in that trade, but cannot effectually stand against all the trades.

Trades unions have a great influence for good or for evil. They perform their charitable functions well, and if rightly managed might prevent, instead of forwarding, strikes and lock-outs. The intelligence of the members is increased by discussion and correspondence; they are better able to understand the state of the market, and to calculate whether the master can afford to pay better

wages. When such is the case, their well-known readiness to strike, and their power to carry it out, will generally insure to them an immediate advance of wages. If trade is bad, and profits are reduced, the trades unionist ought to submit to the reduction of wages without the necessity of a lock-out. But, unfortunately, the members of trades unions have hitherto been in great ignorance of the laws of capital and labour. There has been a want of a proper understanding between employers and employed, and the unions have enabled the latter to gain only a partial knowledge of the affairs of the former; and this has been supplemented by surmises and suspicion, leading to many difficulties and disputes which a frank statement of the truth would have averted.

In fact, trades unions have overstepped their proper bounds. They have not been content with the machinery of free combination, which the law allowed them, but have invoked the aid of terrorism to coerce those who either stood aloof from their unions or who desired to retire from them. The workmen in any trade are at perfect liberty to combine for the purpose of raising wages or reducing hours of labour; they are also at liberty to invite others by fair persuasion to join the combination; but they are expressly forbidden to put force upon dissentients, or to interfere with that free will and independence which in this country is the right of every man. Now, as a matter of fact, trades unions have systematically encroached upon the limits thus laid down for them. More or less, in almost all cases, they have assumed that the union represented the trade, and that all the members of the trade owed obedience to the union. It was obviously their interest to make the union as strong as possible, for the coercion which they could put upon employers was directly proportioned to the number of workmen under their control. It was of no use to call half the men out of a shop if the other half remained at work; and so in the end it has come to this—that the chief work of a trades union consists not in regulating or organizing the conduct of its own members, but in influencing or coercing those whose independent proceedings curtailed the power of the combination.

The attention of the government has at last been called to the organization of those great combinations, and in February, 1867, a royal commission was appointed in the following terms:—'We do hereby enjoin you to inquire into and report on the organization and rules of trades unions and other associations, whether of workmen or employers, and to inquire into and report on the effect produced by such trades unions and associations on the workmen and employers respectively, and on the relations between workmen and employers, and on the trade and industry of the country, regard being had to the investigation of any recent acts of intimidation, outrage, or wrong, alleged to have been promoted, encouraged, or connived at by such trades unions or other associations: with power to suggest any improvement to be made in the law with respect to the matter aforesaid, or with respect to the relations between workmen and their employers, for the mutual benefit of both parties.'

This commission has not yet concluded its sittings, but the revelations that have been made before it have been completely astounding. A special branch of the commission was sent to Sheffield and another to Manchester, at both of which places numerous atrocities have been brought to light. At the former place, members of trades unions have confessed to the planning and execution of several murders, many cases of blowing up houses and shops with gunpowder, and numerous cases of rattening, or the mutilation of the machines and tools of workmen. At Manchester hundreds of thousands of bricks have been wilfully destroyed, simply because a machine was used to make them. Combustible bottles, filled with blasting powder, naphtha, and slugs have been thrown into several master-brickmakers' houses. One builder, having commenced building with machine-made bricks, was compelled to pull them all down, destroy them, and pay a much larger price for others of inferior quality, but made by the hands of trades unionists.

These atrocities do but represent the extreme development of the principles of trades unions, and some of the unionists have openly acknowledged and justified the principles themselves. They have asserted that any member of a trade refusing to become a member of its union, or failing in obedience to its laws, deserves punishment, and that the punishment administered by the Sheffield murderers was excusable in default of more regular facilities of coercion. They have also stated before the commission that it is monstrous that one man should be paid better than another; that intelligence, skill, industry should go for nothing; and that the levelling system should prevail, which made every man alike, whether deserving or undeserving.

The results of the restrictions of trades unions are disastrous alike to the artizan, the employer, and the country. The artizan, so long as he follows manual labour and is a member of the trades unions, is not free individually to embrace any opportunity of increased remuneration; though better educated, more skilful, or more industrious than his fellow, he cannot rise above others of his class, the uniform rate of wages and prohibition of piecework removes all stimulus to exertion, and the man loses self-respect and becomes demoralized. As respects the employer the number of apprentices is restricted; he is not free to select his own men; the amount of work to be performed and the remuneration to be paid are not regulated by competition, but are dictated by the executive of the unions. The use of machinery is frequently prohibited, or, when large sums have been invested in it, it may at any time be laid idle and unproductive by a sudden strike of the operatives. The employer is thus prevented from calculating with certainty the cost of his productions, is liable for broken contracts, and subject to most serious losses. What is a loss to the artizan and his employer cannot but be a loss to the country. The skill and industry of the workmen is not fully developed; the energy of the employer is crippled, and his capital not employed to the greatest advantage. The cost of his commodities is thus increased without any equivalent, and the British manufacturer finds himself unable to compete with the productions of other countries, where labour is free, and where trade is carried on under less oppressive restrictions.

Though it is extremely doubtful whether trades unions have succeeded in raising wages, there can be no doubt that they have raised prices, and that artificially and to an alarming extent. For instance, a building contractor now charges 50 per cent. more than he really ought, in order to compensate himself for the risk of strikes, and also to pay for the enforced idleness, slow working, and vexatious trade regulations of the workmen. This rise of prices always falls heaviest on the workmen themselves. A man whose income is 1000*l.* a year generally lives in a house of about 100*l.* rental; a man of 100*l.* a year in one a little over 10*l.*; but a man of 50*l.* only must live in a much higher rented house than 5*l.* And

all other articles that he wears, uses, or consumes, are artificially raised in price in the same manner; so that if he really receives more money as wages, it is not worth so much to him. [PRICE.] Wages would probably have risen quite as much, and perhaps more, if there had been no trades unions. Though money wages, or the price of the labour of artizans, have risen 50 per cent. in the last forty years, yet the wages of domestic servants have increased much more in the same time, although they have had no strikes or trades unions. The general public can have but little sympathy with trades unionists, as it has to pay for their folly. If one set of craftsmen gain increased wages, it must be at the cost of some other set of craftsmen, for a part of the wages fund is diverted from the latter to the former; or if all craftsmen gain increased remuneration, it must be at the cost of the consumer, who will have to pay increased prices.

Another and more serious effect of the restrictions imposed by trades unions is that they imperil the very existence of an industry in a particular district or country. They increase the cost of a commodity to such an extent as to render it impossible for employers to compete against others in the same trade whose operations are not similarly impeded. Many branches of industry have been driven by trades unions from certain localities to others where masters and men are permitted to act as they please. Moreover, as these societies have increased in numbers and power, so as to include a large majority of the working classes, the industrial prosperity of the nation has been seriously jeopardized, since various branches of industry have not only passed from one locality to another, but have even left the country. In many trades, especially iron, wood, and silk, the competition is so keen and so close, that victory has for years only just turned in favour of Great Britain. The balance of advantage being slightly on our side, it follows that if hampered by many vexatious restrictions, other competitors can readily undersell us, and thus our foreign commerce is imperilled. For it is impossible to compete with foreign countries if our manufacturers are to be dictated to by their workmen with regard to the labourers who shall be employed, the machinery that shall be used, and the mode in which the business shall be conducted.

It is beyond the province of a work like this to suggest remedies for this state of things; indeed, it may fairly be inferred that the royal commission now sitting will find such to be its hardest task. At any rate, the following principles must be recognized and adopted:—'1. Free trade in labour. Every workman has the right to sell, and every employer to purchase his labour, on such terms as they mutually agree upon. Labour should form no exception to the law of free trade, which is sufficient to regulate the price of all other commodities. 2. The high or low rate of wages depends not upon the price of provisions, but on the demand and supply of labour. When many labourers are looking out for work, wages will fall, and they will rise when many employers are looking out for labourers. 3. All restrictive trade regulations, whether of workmen to force up or employers to keep down the price of labour, are injurious, and should cease, because they interfere with the natural price of the productions of labour.' If these principles are correct, and were carried out, then it follows that every workman would be at liberty—'1st. To work, without joining any combination or union, for such rate of wages as the demand for his labour at the time enabled him to obtain from an employer. 2nd. To work any number of hours which his desires or necessities led him to undertake. 3rd. To work at any kind of employment within the reach of his skill and experience which was at the time in greatest demand, although differing from his own particular branch of trade. 4th. To work piece or contract work, and by so doing increase, in proportion to his skill and industry, his weekly earnings, and share with his employer the profits of his labour. 5th. To embrace any opportunity for improving his individual position, or of obtaining increased remuneration for his services. The result of all this would be:—That each workman would find his own level. The skilful and industrious would merit and receive his just reward, while the incompetent and idle would be left in the rear. A greater amount of work would be done in the same time, and at less cost, and thus the wealth and prosperity of the country be greatly increased.'

Legal sanction might with great advantage be given to trades unions as to other mutual benefit societies, but they should become illegal, and their members be severely punished, if violence, fraud, or intimidation takes place, or the rights of third persons are infringed. Some amelioration of the present state of things may also be expected from the better education and increased intelligence of the artizans, making them more prudent, so that they will save a little money, and not marry till they are in a good position. They will thus lessen the number of labourers, and becoming small capitalists themselves, will learn the value of capital, and the economic principles which govern it. Great and beneficial results may also be anticipated from the system of co-operation described in the article STRIKES AND LOCK-OUTS.

In no other European country are there any associations of workmen exactly resembling the trades unions of the United Kingdom, and in none would acts such as those which have lately received the sanction of some of these bodies be tolerated by the law with impunity. In France, Prussia, and Belgium, up to the year 1865, all confederations of workmen, with the view of affecting the rate of wages, were prohibited by law. Since that year, however, such associations have been allowed, if unattended by coercion, violence, or fraud, or interference with third persons. The principle is conceded, but precautions are taken that its operations shall not be dangerous. Very stringent conditions are imposed upon the societies, and offenders are subject to severe penalties. Considerations like these suggest very serious reflections. In England the organization of labour is embodied in a set of societies which, under the pretence of assisting industry, are not only combinations to raise the rate of wages by sheer force, and to dictate to capitalists by intimidation, but have inaugurated a system of lawless terrorism injurious and disgraceful to the country, and have been the occasion, if not the cause, of atrocities condemned by all rational men. Associations of this character are denounced by the law of all Europe as dangerous to the well-being of states, and as fatal to the development of industry, and they are considered and punished as conspiracies against order. English liberty must not allow the unchecked expansion of an evil system, which obviously diminishes the national wealth, deprives capital and labour of freedom, is in the long run injurious to all, and has been associated with deeds of crime which must make all Englishmen blush with shame.

(*Manual of Political Economy*, and *The Economic Position of the British Labourer*, by Henry Fawcett, Esq., M.P.; *Parliamentary Papers*, 1867.)

TRADE-WINDS is the term used by seamen to indicate the perpetual or constant winds, which promote more than any other circumstance trade and navigation. These perpetual or trade-winds occur in all open seas on both sides of the equator, and to the distance of about 30° N. and S. of it. They were unknown to the ancients, and even to modern seamen up to the time of Columbus; but subsequently to that epoch, European navigation extending rapidly in the Atlantic and Indian oceans, the phenomenon was generally observed. It does not, however, appear that any attempt to explain it was made before the time of Galileo, who appears to have had a true, though obscure, perception that the rotatory motion of the earth must be somehow concerned in the production of the trade-winds, but he singularly omitted to consider the operation of the solar heat. The true explanation of the phenomenon was first recorded in the 'Philosophical Transactions' for 1735, by George Halley. Of late years the astronomical point of view from which the objects of meteorology have always been viewed by Sir John Herschel has given to his treatment of atmospheric phenomena a breadth and perspicuity scarcely to be found in the writings of other meteorologists.

The facts respecting the trade-winds, which had been collected by Halley, have not been materially increased in number since his time, but they have been more exactly determined. The trade-winds are met with on both sides of the equator. The mean boundary-line of the region in which they blow, and beyond which variable winds prevail, is about lat. 28° in the eastern parts of the Atlantic Ocean, but in the western parts this line is generally two or three degrees farther N. and S. To the N. of the equator they blow in the eastern parts of the ocean from the N.E., seldom from the eastward of E.N.E., or from the northward of N.N.E. In proceeding farther W. they become more easterly, and often they blow from due E., and sometimes from the S. of E., but generally they are one or two points N. of E. To the S. of the equator the trade-winds in the eastern parts of the ocean blow from S.E., and usually between S.E. and E., but they also decline more to due E. in reaching the western portion of the ocean. They do not occur in the vicinity of the continents, but are chiefly separated from them by a tract of sea in which either periodical or variable winds prevail. Though the trade-winds of the northern and southern hemisphere blow in an oblique direction towards one another, they do not meet in general, but are divided by a tract of sea in which calms frequently prevail, and also variable light winds, mostly from the W., are met with. This region of the calms is distinguished by a thick foggy air, and frequent rains of short duration attended by thunder and lightning. [ATLANTIC OCEAN.] The region of calms which separates the north-east trade-winds from the south-eastern, and which usually occupies a width of four or five degrees of latitude, is not always found at the same part of the ocean, but advances farther north when the sun has a northern declination, and farther south when it is in the southern hemisphere. The same is observed respecting the winds themselves. Though the mean boundary of the trade-winds is 28° of lat. in the eastern parts of the ocean, it extends two, three, and even four degrees farther north when the sun approaches the northern tropic, and about the same distance farther southward when the sun is near its greatest southern declination.

The explanation of these phenomena is to be found in the observed fact that the sun is constantly vertical

over some one or other part of the earth between the tropics, and that the whole of the zone or belt so included between the tropics is, in consequence of the great altitude attained by the sun in its diurnal course, maintained at a much higher temperature than those regions to the north and south which lie nearer the poles. The heat thus acquired by this tropical portion of the earth's surface is communicated to the incumbent air, and becomes the universal primary cause of the phenomena of the winds, in conjunction with the earth's rotation. The colder and heavier air glides in on both sides, along the surface, from the regions beyond the tropics; while the displaced air, thus raised above its due level, and unsustained by any lateral pressure, flows over, as it were, and forms an upper current in the contrary direction, or towards the poles; which current being cooled in its course, and also pressed down by the mass of the atmosphere above to supply the deficiency in the extra-tropical regions, thus keeps up a continual circulation—a surface-current from the higher latitudes towards the equator, and an upper-current towards the poles. Were the earth then at rest there would be an unvarying north wind in the northern half of the globe, and a south wind in the southern half. In consequence, however, of the rotation of the earth, objects on its surface at the equator are carried round at the rate of 17 miles per minute. The further we recede from the equator the less is this velocity; halfway from the equatorial line to the poles, or in lat. 60°, it is just half, or $8\frac{1}{2}$ miles per minute; and so on until at the poles it is nothing. It follows, then, that when a mass of air near the poles is transferred to the region near the equator it is constantly arriving at places which have a greater velocity than itself, and is unable to keep up with the speed of the new surface over which it is brought. Hence the currents of air which set in towards the equator from the north and south must, as they glide along the surface, at the same time lag, or hang back, and drag upon it in the direction opposite to the earth's rotation, that is, from east to west. Thus these currents, which but for the rotation would be simply northerly and southerly winds, acquire, from this cause, a *relative* direction towards the west, and assume the character of permanent north-easterly and south-easterly winds.

It follows from this, then, that as the winds from both sides approach the equator, their easterly tendency must diminish. The lengths of the diurnal circles increase very slowly in the immediate vicinity of the equator, and for several degrees on either side of it hardly change at all. Thus the friction of the surface has more time to act in accelerating the velocity of the air, bringing it towards a state of relative rest, and diminishing thereby the set of the currents from east to west. Arrived, then, at the equator, the trade-winds must be expected to lose their easterly character altogether. And not only this, but the northern and southern currents here meeting and opposing, will mutually destroy each other. 'The result, then,' says Sir John Herschel, 'must be the production of two great tropical belts, in the northern of which a constant north-easterly, and in the southern a south-easterly wind must prevail, while the wind in the equatorial belt, which separates the two former, should be comparatively calm, and free from any steady prevalence of easterly character.' All these consequences are agreeable to observed facts, and the system of aërial currents above described constitutes in reality what is understood by the regular trade-winds.

On the subject of the region of calms intervening between the trade-winds, Kamtz, in his 'Manual of Meteorology,' remarks, 'In the space between the two trade-winds the air is heated to the highest degree. There the ascending currents of air are the most rapid; and by this quick ascent the velocity of the wind blowing along the surface of the sea is greatly diminished. Besides, it would seem that the upper and lower current come into contact with one another at a comparatively small elevation above the surface of the globe. These two circumstances appear to be the reason why no regular winds occur within the region of the calms.'

With respect to the trade-winds in the Pacific Ocean, we find that in the southern parts they appear to be subject to great changes in direction and force, and that they properly occur only along the coasts of South America, where a S.E. wind is always met with at the distance of 500 to 600 miles from the coast. In the middle of the Southern Pacific the current seems by no means regular and constant. Its irregularities are probably produced by the innumerable islands and coral rocks or banks in this ocean between the equator and the southern tropic, and which extend from 130° W. long. to the coast of Australia, the atmosphere over these banks being less rarefied by the increased evaporation than that over the deep water, and consequently not requiring so great a supply of air to restore the equilibrium as the circumjacent parts, which are more rarefied and heated. It appears that in the Southern Pacific the trade-winds are replaced by the north-eastern, northern, and western winds only during the period when the sun is in the southern hemisphere.

A south-eastern trade-wind prevails also in the Indian Ocean from within a few degrees of the eastern side of Madagascar nearly to the coasts of Australia, between the parallels of 10° and 28° S. lat.; but in this ocean from 10° S. lat. to the coast of Hindustan the winds are periodical. [MONSOONS.]

The trade-winds are only met with on the sea; but in some countries of the globe between the tropics, or near them, regular and constant easterly winds occur, which may owe their origin to the same cause. These winds are only observed in extensive level plains, where there is nothing to break their force, or change their direction; for if the wind comes in contact with high land or mountains, its regular progress is obstructed. But over a considerable tract of low level land the air passes without being much changed in its direction and velocity, particularly if the land be barren and destitute of moisture. In the Sahel, or western parts of the Sahara, an eastern wind blows all the year round with great force, but in the eastern district of the Great Desert it is less constant, and not so violent; so that in all respects it may be compared with a trade-wind. An easterly breeze is also found on the plain drained by the Amazonas; and by its assistance the voyage against the strong current of the river may be accomplished nearly in the same time as the voyage downwards with the stream. Humboldt found that this easterly wind, which, near the mouth of the Amazons, is moderate, has acquired such a force at the base of the Andes, that it is almost impossible to keep one's footing against it. A similar easterly current, though of less strength, is found in the great plain which is traversed by the lower course of the Orinoco. (Captain Maury's *Physical Geography of the Sea*; and Felix Julien, *Les Harmonies de la Mer*.)

TRADESCANT, JOHN, the name of two English naturalists, father and son, who flourished about the seventeenth century. The elder Tradescant was born in Holland, came to England early in the reign of James I., was for some time in the service of the earl of Salisbury, and in 1629 became royal gardener to Charles I. He travelled in Europe, visited the Mediterranean, and accumulated a collection of plants extraordinary for size and completeness in that non-botanical age. The younger Tradescant was also distinguished by his love of plants and his partiality to curious objects. He was, in fact, both a botanist and a virtuoso. The museum which he founded at South Lambeth he bequeathed to the antiquary Elias Ashmole, and it became the nucleus of the celebrated 'Ashmolean Museum,' which is still preserved at Oxford University. The year of his death is uncertain.

TRADESCA'NTIA, a genus of plants of the natural family of *Commelinaceæ*, which was so named in honour of the English botanist John Tradescant, who was gardener to Charles I. The species are natives of America and of India. Many of them being of a highly ornamental nature, are cultivated in flower gardens. *T. virginica*, a native of North America, is the species most common in the flower borders of English gardens. *T. zebrina* is a rapid grower and a beautiful climber, of semi-hardy character.

TRADITION (from the Latin *tradere*) comprises, in the widest sense of the word, all that has been preserved concerning the events of the past, and in this sense all history is tradition. But the different ways in which accounts of past events are transmitted make a difference in the accounts themselves, which are accordingly designated by different terms. In the early ages of mankind and of every nation, when the art of writing was unknown or little used, all events were handed down by oral communication from generation to generation. Afterwards when these were written down and assumed a definite shape, or many shapes, according to the information, the opinions, or the judgment possessed by the person or persons who recorded them, such records would naturally be distinguished from accounts written by eye-witnesses at or soon after the times when the events occurred. Historical criticism distinguishes these two kinds of annals by calling the former *tradition*, in a narrower sense of the word, and the latter *history*. The characteristic peculiarity of tradition, in this sense therefore, is that for a time it was transmitted from father to son, or from generation to generation, by oral communication, and was subject to all the influences of such communication, until it became fixed by being put into a written shape. Those who know how, even in our day, reports are changed and embellished, how some features are omitted and others added during the process of passing from mouth to mouth, and how in the end they frequently assume a totally different aspect from what they originally bore, will readily admit that such traditions cannot be received with the same faith as contemporary history. It requires great judgment in an historical writer to handle them. His object should be to discover the genuine story, and to give it simply as he finds it; for thus we have at least a faithful memorial of the manner in which our ancestors conceived and viewed certain things.

In the history of Christianity the term tradition has been applied to the doctrines said to have been communicated by Christ to his apostles, which were not written by them, but were transmitted by their oral instruction to their successors, propagated in the church by the bishops, and prevented from becoming corrupt, like other traditions, by the influence of the Holy Ghost. These accounts are preserved in the writings of the ecclesiasti-

cal fathers, and the Church of Rome regards them, next to the Bible, as a source of knowledge which ought to regulate the life and religious observances of Christians. Thus the New Testament and tradition go hand in hand, and exercise a mutual influence, by completing and explaining one another. The subject of the tradition revered by the Church of Rome affects, however, rather the forms of religion than its essence; and some of these forms are retained and observed by Protestants, while on the whole they reject tradition, and do not consider it binding.

TRAFALGAR, CAPE, is a headland on the S.W. coast of Spain, lat. 36° 10′ N., long. 6° 1′ W. It is only memorable for the great naval victory gained off it by the English, under Lord Nelson (who was killed in the action), over the combined French and Spanish fleets, on the 21st October, 1805. [NELSON.]

TRAFFIC, METROPOLITAN, REGULATION OF. The immense increase of the traffic of London in recent years continually led to great public inconvenience, and also to a vast number of accidents. After many abortive attempts to legislate on the subject an Act was passed in 1867, entitled 'The Metropolitan Streets Act,' and came into operation on January 1, 1868, the principal provisions of which are as follows:—Between ten in the morning and seven in the evening no person shall remove any ashes, dust, or refuse from any house in any street named by the commissioner of police: no cattle shall be allowed to be driven through the streets during the same hours, except with the permission of the commissioner of the police: no picture, print, board, placard or notice, except in such form as may be approved of by the commissioner of police, shall be carried or distributed by any person riding in a vehicle or being on foot, but this section does not apply to the sale of newspapers. The driver of a metropolitan stage carriage shall not stop such carriage for the purpose of taking up or setting down passengers at any part of a street, except as near as may be to the left or near side of the roadway. Power is also given to the head of the police to direct the route to be taken by all vehicles, and also the places at which only metropolitan stage carriages may take up and set down passengers. Between the hours of ten in the morning and six in the evening no coals and no casks (wines or spirits excepted) shall be loaded or unloaded across any footway within the special limits of the Act; and between ten and seven no person, except with the permission of the commissioner of police, shall drive or conduct along any street any cart, carriage, or other vehicle laden with timber, metal, or any other article which exceeds in length 35 feet, or which protrudes more than 8 feet 6 inches behind the vehicle, or more than 1 foot from the sides of the vehicle: nor carry in any way along any street any ladder, scaffold pole, or other article which exceeds 35 feet in length or 8 feet 6 inches in breadth: nor drive or conduct along any street any cart, waggon, or other vehicle used for conveying goods or merchandise, and drawn by more than four horses.

The police may take possession of any dog found in the metropolis, and not under the control of any person, and may detain such dog until the owner has claimed the same, and paid all expenses incurred by reason of such detention. The commissioner of police, if he see fit, may issue a notice requiring any dog while in the streets, and not led by some person, to be muzzled in such a manner as will admit of the animal breathing and drinking without obstruction; and the police may take possession of any dog found loose in the streets without such muzzle during the currency of such order, and may detain such dog until the owner has claimed it, has provided a proper muzzle, and has paid all expenses connected with such detention. Where any dog taken possession of by the police wears a collar with the address of any person inscribed thereon, a letter stating the fact of such dog having been taken possession of shall be sent by post to the address inscribed on the collar. The commissioner of police may cause any dog which has remained in the possession of the police for three clear days without the owner claiming the same, and paying all expenses incurred by its detention, to be sold or destroyed. Upon complaint that any dog has bitten or attempted to bite any person, a magistrate may direct the dog to be destroyed. All dogs detained by the police shall be properly fed and maintained.

The commissioner of police may, if he thinks fit, from time to time license street shoeblacks, and commissionaires or messengers, to exercise their calling, and appoint places at which they may stand to do so; and none but those so licensed shall have the privilege.

Any three or more persons assembled together in any part of a street within the metropolis for the purpose of betting, shall be deemed to be obstructing the street. The penalties for infringing the Act are a sum not exceeding 40*s.* in nearly every case, but for the betting offence the fine is raised to 5*l.*

TRAGACANTH. [ASTRAGALUS.]

TRAGEDY (Gr. τραγῳδία), a well-known form of dramatic composition, distinguished by its elevated diction, solemn tone, and mournful catastrophe. The name is usually derived from the old Greek custom of leading about a goat in the festivals celebrated in honour of Dionysius, when certain dithyrambic and choral odes were sung, that proved the foundation of the tragic drama. But it is most probably to be ascribed to the goat-like appearance of the pretended Satyrs who sung or acted with mimetic gesticulations the old Bacchic songs, and from their resemblance to goats were sometimes called τράγοι, and their song τραγῳδία. In due time an actor or speaker, independent of the chorus, was introduced, who spoke in recitative, and who in conjunction with the chorus maintained a dialogue, and carried on a certain dramatic action. This important innovation is generally attributed to Thespis, a native of Icarius, who flourished in the time of Peisistratus; and that he wrote serious dramas is evident from the titles of the plays ascribed to him. His first representation took place B.C. 535. His immediate successors were the Athenian Chœrilus and Phrynichus, the former of whom wrote plays as early as B.C. 524. But the greatest improvements were effected by Æschylus, who added a second actor, diminished the parts of the chorus, and made the dialogue the principal portion of the action. He also availed himself of the aid of the scene-painter and the costumier. A third actor was introduced by Sophocles, who made further improvements in scene-painting and costume, and the prologue was the invention of the last of the three great Greek dramatists, the tender and melancholy Euripides.

The Roman tragedy was an imperfect imitation of the Greek, and seems to have been invented by Livius Andronicus, B.C. 240. He was succeeded by Naevius; next to whom came Ennius, and, in due order, Pacuvius, Attius or Accius, Varius, and Seneca, whose tragedies are the only complete Latin works of the kind that have descended to posterity.

In modern times two distinct schools of dramatists have arisen, the classical and the romantic; the former adhering to the model furnished by the ancients, the

latter indulging the bent of their own genius, and disregarding the severe rules laid down by Aristoteles and his followers. Speaking generally, we may cite Shakspeare as a master of the romantic, and Racine of the classic style. Before Shakspeare, however, Peele and Marlowe had given to the English stage some tragedies of the romantic school; which, we may add, has always been most favoured by an English audience, Addison's 'Cato' being the only classical drama that ever attained any popularity in our theatres, and that owing its reputation rather to the literary fame of its author than to any intrinsic merits of its own. In France, on the other hand, the classical school long held possession of the stage, though its absurdities were vigorously ridiculed by Molière, and its example was openly defied by Voltaire. Germany has always been devoted to the romantic school, and its greatest tragic writer, Schiller, shows a complete independence of the Aristotelian unities. Alfieri, the most eminent Italian dramatist, modelled his tragedies, on the other hand, in strict conformity with the ancient models; but later writers, as Manzoni, Monti, and Niccolini, have diverged into newer and fresher paths.

Our latest English dramatists are all followers of the romantic school, at least all who have obtained acceptance on the stage. The most popular tragedies recently produced are those inspired by the genius of Joanna Baillie, Sheridan Knowles, Talfourd, and Dr. Westland Marston. A fine tragic poem, by Robert Browning, 'The Blot on the 'Scutcheon,' and Mr. Henry Tayler's 'Philip Van Artevelde,' have also been successfully acted, but their peculiar merits will best be appreciated by the student in his closet.

TRA'GIA, a genus of plants of the natural family of *Euphorbiaceæ*. The species are found in India and in America, are climbing in habit, and some are remarkable for stinging as violently as nettles.

TRAGOPO'GON, or Goat's Beard, a genus of plants of the natural family of *Cichoraceæ*, which is usually considered only a tribe of the great order of *Compositæ*. It is named from the long silky beard or pappus of the seeds. *T. gracilis* is found in the Himalaya mountains, and the leaves are eaten by the natives as lettuce is in Europe, but without being blanched. The best known species, however, is *T. porrifolius*, Salsify, which is occasionally cultivated in this country, but frequently in France and Germany. The roots are the parts esteemed; they are long and tapering, their flavour is mild and sweetish, and they are boiled or stewed like carrots. The stalks of year-old plants are sometimes cut in the spring, and, when similarly dressed, taste like asparagus.

TRAINING, PHYSICAL. The result of perfect physical training is that state in which a man is able to make the most vigorous and prolonged muscular effort of which his body is capable, and which, consequently, is the highest condition of health. Training is, or rather ought to be, only the strict observance of the laws of hygiene for a longer or shorter time, that the body generally, and in some cases one set of muscles particularly, may attain the maximum of strength. But there are systems which combine unnatural and unscientific dietaries with unduly severe exercise; these fail in their object, and induce a condition in which the waste is made to exceed the supply. Though trainers seldom commit both, there are few of them who do not fall into one or the other of these great errors. In his book, 'The Advancement of Learning,' Lord Bacon observes, when alluding to the athletic exercises of ancient and modern times, 'that the practises are known, but the philosophy that concerneth them is not much enquired into.' This observation is thoroughly applicable to the training systems of our own day. They have arisen among us without any relation to physiological science, and they are entirely the result of observations and experiments made by uneducated men, whose deductions were much vitiated by prejudice.

The Greeks and Romans were thoroughly alive to the value of systematic preparation for athletic contests. Several classic writers have given us full and accurate accounts of their method, which Horace thus epitomizes:

> 'Qui studet optatim cursu contingere metam
> Multa tulit fecitque puer; sudavit et alsit,
> Abstinuit Venere et Baccho.'—*De Art. Poet.*

The candidates for the simple prizes of their magnificent athletic contests passed through a course of preparation which lasted ten months; during that time they were restricted to a prescribed diet, and daily exercised themselves in the gymnasia, which had been erected in all the larger towns. These gymnasia were first built by the Lacedæmonians, from whom the Athenians afterwards copied them, building three, called respectively Academia, Lyceum, and Gynoscerges. Not only were they taught in these buildings, by experienced instructors, boxing, wrestling, and all the various health-giving exercises of those days, but here also Plato and the most distinguished philosophers trained the strongest minds of Greece and Rome. The dietary of the ancient trainer is diametrically opposed to the regimen of the present day. For the first week or two the diet of the athletes of old consisted of new cheese, boiled grain, and dried figs. After a while animal food was given to them, pork being the most highly esteemed, and it was considered necessary, not only to satisfy their appetites, but absolutely to gorge them with this food. In the training of boxers it was thought necessary to make them fat, with the view of deadening the blows inflicted by their adversaries; they were also taught to endure pain, and, as a means to that end, a beating with boughs of the prickly rhododendron was occasionally administered to them. The morals of professed athletæ were condemned by all the writers of that time, and we are not surprised to find that Galen considered them a shortlived class of men. Nor is it very astonishing that, in the opinion of ancient physicians, the result of this gorging and fattening process was not a condition of perfect health. At the close of each day the Greek or Roman athlete bathed in tepid water, and was scraped over with the strygil, an instrument answering the purpose of the modern flesh-brush; he was then immediately anointed with oil, and having completed the labours of the day he dined.

The practice of training arose in England between the years 1720 and 1750, when pugilism became a national pastime, and the celebrated boxer, Gentleman Jackson, reduced it to a system which was, perhaps, rather in advance of the science of his day. (See detailed account in Todd and Bowman's 'Physiology.') Many professional athletes, even now, when in training, adhere to the rules laid down by that worthy, while others have the highest veneration for the traditional precepts of a certain 'Old Joe Ward,' whose 'three threes' were received with implicit faith by the pugilistic fraternity until a very recent date—'three doses of salts, three sweats, three vomits, for three weeks, with victuals three parts done.'

A nearer approximation to scientific truth was made when large numbers of gentlemen began to train for

boat races. They adopted a much more liberal and varied diet, and the prejudice in favour of what was called 'Iron Ring,' or 'all potent water gruel,' and other fabled strength-givers, is, in consequence of their example, rapidly dying out.

No sudden transition from sedentary occupations to a life of vigorous exertion is desirable or safe. The daily amount of exercise should be gradually increased for three or four weeks before strict training commences. The period of preparation for an athletic contest cannot well be *too long*, but no great feat of strength should be attempted without a probation of, at the shortest, six weeks' duration. The athlete will do well to wean himself from the use of tobacco and fermented liquors, as both should be prohibited when regular training is commenced. He should also accustom himself to early hours.

The day having now arrived when systematic training is entered upon, the athlete should leave his bed at about seven o'clock, and immediately take a cold bath; not later than eight in the morning, and *before any work has been done*, his breakfast should be served. This meal may consist of broiled or cold roast beef, mutton, chicken, or game. The meat should always be well cooked, and not underdone. There is no better beverage than tea not taken too hot or strong. Those who are not of a bilious habit may substitute milk. No greater quantity of these drinks should be taken than a pint and a half per diem, but this may be supplemented by as much water as is desired. Other fluids might be drank merely to gratify the sense of taste; water will not be imbibed unless to supply the requirements of the system, which are indicated by the natural sensation of thirst. It is, of course, supposed that no one in an *abnormal* or *diseased* condition will undertake so severe a trial as is involved in a course of athletic training. Though neither eggs nor milk is a suitable article of diet for individuals of a bilious tendency, they both contain very much nutriment, a large proportion of which is of the heat-giving or fat-forming kind; these carboniferous foods are, as much as possible, eliminated from training dietaries; but even if it were possible it would be a great error to exclude them entirely. A certain proportion of the carboniferous elements of food seems to be used in the nutrition of the nerve tissues, and it will probably be discovered that the non-nitrogenous foods afford more histogenetic material than is generally credited to them. We may therefore add either eggs or milk to the list of edibles for breakfast and supper, as they are more easily assimilated than most highly carboniferous substances. The most digestible food should always be selected on the principle of economizing force, and also to secure an earlier fitness for active exercise, which may be commenced about two hours after breakfast, when a sharp run, row, or other strong effort will be well borne. Exercise should be continued, with only short intermissions, until one o'clock; half an hour will then be occupied in rubbing the skin with hard towels, putting on dry flannels, and otherwise preparing for dinner. As a rule this meal will consist of either broiled or roast meats, but boiled viands may be substituted for them occasionally by way of a change. Game, including venison, pigeons, and wild rabbits, yield much muscle-forming food, also beef, mutton, and fowls. The white-fleshed fishes and trout will serve as an occasional variety, but it is better to avoid the red-fleshed fishes and eels. Pork, veal, goose, lamb, duck, and all salt meats must be eschewed. A little vegetable should be eaten; cauliflower, spinach, peas and beans, are among the most

nutritious. Less vegetable food is required if a little ripe fruit be taken after dinner. Light puddings and jelly need not be forbidden, but trifle and similar confectionery should not be tasted. The best drink at this meal is either water or milk. Bread made from flour which contains the dressing or internal covering of the grain, is better than either bran or fine white bread. The severest work should be undertaken during the hours intervening between dinner and supper. For two or three hours after dinner, no severe exertion is permitted, but a quiet stroll, a game of quoits, or croquet, or bowls will be beneficial. It is a customary but erroneous practice to get through the most of the daily work of training, *before* the principal meal of the day has been eaten. We are in the most favourable condition for great and prolonged muscular exertion *after* this meal has been assimilated; the reinforced blood is then prepared to replace at once the waste of tissue which all effort, whether mental or muscular, invariably entails. Nor is the stomach prepared to digest a heavy meal soon after exhaustive exercise, for then the current of blood is diverted to the extremities, and *away* from the stomach, which requires a vigorous circulation in its parietes while performing the important function of digestion. At seven or half-past seven a chop, some cold meat, or oatmeal porridge made with milk, bread or toast, and tea will constitute the athlete's evening meal. Dr. Letheby, quoting Lehman, declares that tea and coffee greatly diminish the wear and tear of the system; they oil the machinery as it were, and check the waste of friction, for those who use them find that during active exercise the destruction of tissue is prevented, and there is less demand for food. Green tea should not be used.

The kind of exercise and the severity of it will vary with the object in view. If training for matches, in which a long distance is to be rowed or run, the course should be traversed twice in the day, both in the morning and in the afternoon, gradually increasing the speed for the first eight or ten days. After that time the distance should be gone over once daily at the highest possible speed, and the time occupied in doing this should be carefully noted. When the match is only for some distance under one mile, the length of the course and a little further, should be traversed three or four times each day.

A crew preparing for a boat-race should proceed in the cautious manner before recommended for the first week or ten days; afterwards, each morning, they must row over the appointed course 'against time.' In the afternoon a long row, at a steady pace, extending over as long a distance as can be accomplished without distressing the men, will be of the greatest advantage. The crew, on getting out of their boat, would do well to start for a run of at least two miles, and the pace may reach the rate of one mile in seven minutes, after the first week or two. It will be best to exclude all condiments, except salt, from the training dietary. Artificial methods of inducing profuse secretion from the skin, by means of packing in wet sheets, extra clothing, &c., are highly objectionable. Rapid and vigorous exercise is the only healthy method of reducing fat, and in *this* way strength is gained, and not lost, in the process. The sleep which we obtain in the early morning hours, as Professor Playfair has shown, is not so valuable as that which we get before twelve at night. Most men, when working hard, require eight hours' sleep. For these and other reasons men in training should be in bed by half-past ten o'clock.

No one who proposes to engage in athletic contests

should require physic, either immediately before or during training, for these contests are searching ordeals which none but the healthy can safely undergo. After the first day or two of regular exercise, the stomach and other viscera, if free from disease, will perform their various duties without the stimulus of medicine.

It is highly important to provide that the period of training be made as pleasant and agreeable as possible to the athlete. Unwilling and reluctant labour is injurious rather than beneficial to the health and strength. And perhaps the best means of keeping the body in a state fitted for exertion, is to be found in the regular use of such places as the Royal Gymnasium, Edinburgh, which has the advantage of being in the open air, and in addition to a race-course, contains much novel and useful apparatus, well-suited to the gradual development of the muscles and of the system generally.

TRAJANO'POLIS ('the city of Trajan'), or *Selinus*, was the most western town of Cilicia. The Emperor Trajanus having died at Selinus, this town received its classical appellation. It was situated at the mouth of the river Selinus, on a steep rock, surrounded on three sides by the sea.

Another Trajanopolis was situated in Mysia, between Antandrus and Adramyttium.

A third Trajanopolis was a town in Thrace, most probably built by the Emperor Trajan, who adorned it with beautiful buildings. It was situated on the river Hebrus, at a little distance north of the pass which is formed by this river through the range of Mount Rhódope, and about 40 miles from its mouth. The modern town is on the Maritza, or Hebrus, on or very near the site of the ancient. It is the see of a Greek archbishop, and a small place of no importance.

TRAJAN'S PILLAR, a distinguished work of art, executed by Apollodorus of Athens, which formerly stood in the centre of the Roman forum, and still remains as an historical record of Trajan's reign, and one of the finest specimens of artistic skill. It was erected in 114, to commemorate the emperor's victories over the Dacians; and is entirely surrounded with bas-reliefs of his exploits, amounting to about 2000 heads. The figures have very little relief. Those at the bottom of the column are 2 feet high; and those at the top appear of the same size, because the artist made allowance for the law of perspective, and enlarged his figures in proportion as they approached the summit. The pillar is built of white marble; and its base, which consists of twelve enormous-sized stones, is raised on a socle, or foot of eight steps; and in the interior is a staircase, which receives its light from forty-four windows. Its height is 144 feet; and its sculptured ornaments are considered superior to those of the Antonine column, which is 35 feet higher.

TRAJA'NUS, MARCUS ULPIUS NERVA, was most probably born in A.D. 53, at Itálica, the present Alcalà del Rio, on the Guadalquivir, not far from Sevilla in Spain. He distinguished himself at an early age in the wars against the Parthians and the Jews, became consul in A.D. 91; and afterwards commanded the legions on the Lower Rhine. His military talents and his amiable character made him popular with the troops; and the Emperor Nerva adopted him in A.D. 97, and chose him for his successor. This was a novel event in Roman history, the imperial throne having hitherto been exclusively occupied by members of the old Roman aristocracy. Trajan was the first emperor born beyond the limits of Italy.

On the death of Nerva, in January, A.D. 98, Trajan succeeded to the imperial throne, and soon proved that he deserved his elevation. His virtues and eminent qualities are commemorated in the panegyric which Pliny the Younger read in the senate A.D. 100. In 103 Pliny, who was a personal friend of the emperor, was appointed proconsul of Bithynia and Pontus. The letters that passed between them are the best sources with regard to his private character.

In A.D. 100 Trajan crossed the Danube to oppose the Daciæ; and in 102 their king Decébalus submitted and gave up part of his territory. Decébalus broke the peace in 104, and Trajan again advanced against him. To secure a passage over the Danube, he constructed the great bridge of which Dion Cassius has given a description. Decébalus was defeated, and killed himself, and in 106 Dacia was made a Roman province and colonized by Roman settlers. To commemorate the emperor's Dacian victories, a column was erected in 114, by the architect Apollodórus, on the Forum Trajani, which still remains. [TRAJAN'S PILLAR.]

After the conquest of Dacia eight years of peace elapsed, which Trajan employed in a wise and liberal administration, and in adorning Rome with beautiful buildings; he also founded a library, the Bibliothéca Ulpia, and an institution for the education of poor children of Italian parents. In 114 he left Rome to lead his armies against the Parthians, who were defeated, and in one campaign he conquered Mesopotamia and delivered Armenia. He took up his winter quarters at Antioch, relieved the Syrians, who were suffering from the consequences of a violent earthquake, and in the following year opened a new campaign. He crossed the Tigris, and the Parthians having again been defeated, captured the towns of Nisibis, Edessa, Ctesiphon, and Seleuceia; and Babylonia, Assyria, Armenia, and Mesopotamia became Roman provinces. He then sailed with his fleet on the Tigris to the Persian Gulf, and when he had reached the sea, the example of Alexander suggested to him the idea of conquering India; but remembering his advanced age, he renounced that scheme. In 117 he made an incursion into Arabia, and ordered a fleet to be stationed in the Red Sea. Suffering from dropsy, he set out for Rome; but he died on his way at Selinus, a town in Cilicia [TRAJANOPOLIS], in August, 117, at the age of sixty-three years nine months and four days, according to Eutropius. He was succeeded by Hadrianus.

TRAJECTORY, the technical name which was formerly given to a curve. It now designates a curve which enters into all curves of a given system at the same angle. If the angle be a right angle, the curve is said to be an orthogonal trajectory.

TRALEE. [KERRY.]

TRAM-WAY. A road prepared for the easy transit of trains or waggons by forming the wheel tracks of smooth beams of wood, blocks of stone, or plates of iron. It may be described as a species of railway adapted for the passage of carriages or waggons with wheels of the ordinary form.

TRANCE. [CATALEPSY.]

TRA'NI, a town in Southern Italy, situated on the coast, 26 miles N.W. from Bari, in the province of Terra di Bari, gives title to an archbishop, and has 22,702 inhabitants. The civil and criminal courts of appeal for the provinces of Terra di Bari and Terra d'Otranto hold their sittings in Trani. The town is well built, is surrounded by a wall with towers and moats, and is entered by three gates. It has a castle, erected by the emperor Frederick II.; a handsome cathedral, several

other churches and convents, theatre, a harbour for small vessels, and some good quays. The inhabitants carry on a considerable trade in oil, corn, wine, and cotton. There are also some manufactures of the latter. Trani was one of the points of embarkation of the crusaders.

TRANQUEBAR, a fortified seaport town of Hindustan, on the Coromandel coast, in the delta of the Cavery, 140 miles S.W. of Madras: 11° N. lat., 81° 54′ E. long. It stands between two arms of the river, is surrounded by ramparts faced with masonry, and having, at the S.E. angle, the castle of Dansborg, a lighthouse, and the government offices. The town is neatly built, and the houses are wholly of European architecture, with Grecian porticos, and windows of rattan lattices. The country in the rear of Tranquebar is cultivated and well wooded. The temperature commonly ranges between 70° and 100° Fahr.; but the heat is moderated by sea breezes, and this place being much cooler and healthier than Madras, it has been made a convalescent depot. The bay at the mouth of the Cavery is always safe for small vessels, and the surf is less violent than at Madras or Pondicherry. Some manufactures of coarse cottons and handkerchiefs, oil, soap, leather, and salt, are carried on; and these goods, with rice, paddy, and skins, are shipped for Madras, Ceylon, and occasionally the Mauritius and Bourbon. Population of the town about 25,000. Tranquebar belonged to Denmark till 1846, when it was ceded by purchase to England.

TRANSCENDENTAL, a technical term in philosophy, derived from the Latin *transcendere*, 'to go beyond a certain boundary.' In philosophy transcendental signifies anything which lies beyond the bounds of our experience, or which does not come within the reach of our senses. It is thus opposed to *empirical*, which may be applied to all things which lie within our experience. All philosophy, therefore, which carries its investigations beyond the sphere of things that fall under our senses is transcendental, and the term is thus synonymous with metaphysical. Transcendental philosophy may begin with experience, and thence proceed beyond it; or it may start from ideas *à priori* which are in our mind: in the latter case philosophy is purely transcendental, while in the former it is of a mixed character.

TRANSCENDENTAL, a mathematical term opposed to *algebraical*, and applied to those algebraical expressions in which something more than the common rules of arithmetic, or combinations of them, are required.

TRANSEPT. The transverse portion of a church which is built in the form of a cross; that part which is placed between the nave and choir, and extends beyond the sides of the area which contains these divisions, forming the short arms of the cross upon which the plan is laid out.

TRANSFUSION OF BLOOD is the operation of transferring the blood of one animal into the blood-vessels of another, and is sometimes beneficially employed for reviving those who are nearly dying after severe hæmorrhage. The operation has long been used as a means of experiment, and in the vain hope that by injecting the blood of a healthy man or animal into the vessels of a diseased one, the health of the latter would be restored; but it had rarely been employed for its only useful purpose, till Dr. Blundell, after a long series of well-conducted experiments on animals, proved that it might be safely and advantageously employed in men. The operation has indeed often failed; it has often been unnecessarily performed; and its performance is not unaccompanied by danger to the patient: but still there is sufficient evidence of its high utility in cases which, without it, would have been quite or nearly hopeless, to warrant its being resorted to under the guidance of a sound judgment.

TRANSIT, or TRANSIT INSTRUMENT (called by the French *lunette meridienne, instrument des passages*), an astronomical telescope, made to move in the plane of the meridian, so that the moment of any star passing a vertical wire in the middle of the field of view (and which covers a part of the meridian) may be ascertained. Usually there are several auxiliary wires at equal distances on each side of the middle wire, and the mean of the times at which the several wires are passed, is more accurately the time of meridian passage than that derived from the middle wire itself. The instrument was invented about 1690, by Römer.

The observations made by it are of two kinds—transits of stars and measures of angular distance in declination. The first consists in noting the clock time when a celestial object passes the system of wires, which in some cases, for greater fineness, are simply lines of spiders' web stretched across the view in the eye-piece. By these observations is found the exact error of the clock that has been employed, from which can be deduced correct time. In the case of the Royal Observatory, the astronomer is able to communicate, by means of electric wires, exact Greenwich time to the world. These transits, too, afford the means of fixing the position of the stars in right ascension, after the observations are properly reduced by computation. In the case of some of the principal observatories, the transit instrument also performs the office of the old mural circle, by observing or fixing the positions of the stars in declination. The graduated circle attached to it is provided with a narrow band of silver let into the iron, of which it is principally constructed, and on this thin lines are engraved at very minute distances from each other. These lines or divisions are read by powerful microscopes, so that great accuracy can be attained in the observations.

Recently a method has been devised for recording transits, founded upon the principles of electro-magnetism. The sidereal clock is made to break the electric circuit at regular intervals of one second, and by a process similar to that employed in Morse's telegraph, the effect is impressed on a recording apparatus in connection with the clock. The observer is also enabled to break the circuit at any instant between two successive beats of the clock, and to record the fact in its proper place upon the registering paper. Hence, in determining the transit of a star, the observer breaks the circuit at the instant of the star's passing each successive wire, and the results are imprinted in their proper place upon the recording apparatus. The distance between one of such recorded results and the nearest second as imprinted by the regular break-circuit apparatus of the clock, will indicate the fractional part of a second corresponding to the instant of the star's passage of the wire. In this method the eye and the sense of touch are called into operation, instead of the eye and ear, as in the usual method, which consists in counting the beats of a clock, and estimating the fraction of a second when the object passed one of the wires in the telescope. The clock time is then entered into the observer's book, the operation being repeated according to the number of wires. The differences depending on personal equation are almost annihilated by this new or chronographic method, which is well adapted for recording the transits of a great number of stars within a short compass of time.

TRANSITION ROCKS. When the general terms

'Primitive' and 'Secondary' were much in use among geologists, certain assemblages of rocks, which were of intermediate position, and seemed to unite the mineral aspect of the primitive with the organic enrichments of the secondary, were for these reasons called 'Transition.' The term was very extensively used by the pupils of Werner, and maintained, till within a few years, an important place in geological nomenclature. This classification has since been altered, and the original classes of primary and secondary rocks are now referred to the Palæozoic period.

TRANSITS OF MERCURY AND VENUS. The inferior planets, as they are called, whose orbits are within that of the earth, may sometimes be seen to pass like round black spots across the disc of the sun. These *transits* do not take place very often, as they can only occur when the planet is in or very near to the node of its orbit, at the time when a line drawn through the sun's centre and that node passes through the earth. The transits of Venus are phenomena of very great importance in astronomy, as it is owing to the observations which have been made on them, and the calculations founded thereon, that the distance of the sun has been very nearly ascertained, and the dimensions of the planetary system determined to a near approximation of the truth. They only take place at intervals of eight and 113 years, in the months either of June or December. The transits of Mercury occur much more frequently, but are comparatively useless from the difficulty of observation. They take place in May or November, according to the particular node in which they occur. The first transit of Mercury that was ever observed was seen by Gassendi, on November 6, 1631; the first transit of Venus, by Horrocks, on December 4, 1639. Halley pointed out the use of such transits, and so great was the importance attached to them, that several of the European states fitted out expeditions to different parts of the world to observe those of 1761 and 1769, this being one end, among others, of the celebrated expedition of Captain Cook, in 1769, to the islands of the Pacific Ocean.

The following are the dates of those transits which have occurred since their first observation, or will occur for a long time to come:—

Transits of Mercury.

Nov. 6, 1631.	Nov. 10, 1736.	Nov. 11, 1815.
Nov. 8, 1644.	Nov. 2, 1740.	Nov. 4, 1822.
Nov. 2, 1651.	Nov. 4, 1743.	May 5, 1832.
May 3, 1661.	May 5, 1753.	Nov. 7, 1835.
Nov. 4, 1664.	Nov. 6, 1756.	May 8, 1845.
May 6, 1674.	Nov. 9, 1769.	Nov. 9, 1848.
Nov. 7, 1677.	Nov. 2, 1776.	Nov. 11, 1861.
Nov. 9, 1690.	Nov. 12, 1782.	Nov. 4, 1868.
Nov. 2, 1697.	May 3, 1786.	May 6, 1878.
May 5, 1707.	Nov. 5, 1789.	Nov. 7, 1881.
Nov. 6, 1710.	May 7, 1799.	May 9, 1891.
Nov 9, 1723.	Nov. 8, 1802.	Nov. 10, 1894.

Of these the transits yet to come in 1868 and 1878, will be visible (weather permitting) in this country.

Transits of Venus.

Dec. 4, 1639.	Dec. 8, 1874.	June 7, 2004.
June 5, 1761.	Dec. 6, 1882.	June 5, 2012.
June 3, 1769.		

Of these the transits of 1882 and 2004 may be visible in this country.

TRANSLATION. This word is used in mechanics, as distinguished from *Rotation*, in the following manner:—A body has motion of translation when all its points move in parallel straight lines; when, in fact, all its points have the same motion. If all have not the same motion, there is either simple rotation, that is, about one permanent axis; or rotation about a varying axis; or else a compound of translation and rotation. The motion of a single point must always be called translation, rotation being an inadmissible idea.

TRANSMUTATION, in Alchemy, the pretended operation of changing what were called the imperfect metals, as lead, copper, tin, into the two precious metals, gold and silver.

TRANSOM, in Architecture, the horizontal piece framed across a double-light window. Where no transom exists, the window is called a *clerestory* window.

TRANSPIRATION, PULMONARY, is the exhalation of watery vapour, which is constantly going on from the blood circulating through the lungs.

TRANSPLANTING. [PLANTING.]

TRANSPORTATION, PENAL SERVITUDE, PRISONS, AND CRIMINAL STATISTICS. Transportation is derived from two Latin words (*trans* and *porto*), and means removal, banishment to some fixed place. Under PUNISHMENT, the general nature of punishment has been considered, and in this article we shall confine ourselves to a brief notice of those which are called *Secondary Punishments*, which comprise transportation, penal servitude, and imprisonment generally.

The statute of 39 Eliz. c. 4, for the banishment of dangerous rogues and vagabonds, was virtually converted by James I. into an Act for transportation to America by a letter to the treasurer and council of the colony of Virginia, in the year 1619, commanding them 'to send a hundred dissolute persons to Virginia, which the knight-marshal should deliver to them for that purpose.' Transportation is not distinctly mentioned in any English statute prior to that of 18 Car. II. c. 3, which gives a power to the judges at their discretion either 'to execute or transport to America for life the moss-troopers of Cumberland and Northumberland.' Until after the passing of 4 Geo. I. c. 2, continued by 6 Geo. I. c. 23, this mode of punishment was not brought into common operation. By these statutes the courts were allowed a discretionary power to order felons who were by law entitled to the benefit of clergy to be transported to the American plantations, and the system was continued from 1718 till the commencement of the War of Independence in 1774.

A plan for the establishment of penitentiaries, which was strongly recommended by Judge Blackstone, Mr. Eden (afterwards Lord Auckland), and Mr. Howard, was taken into consideration by Parliament, and the Act 19 Geo. III. c. 74, for the erection of penitentiaries, was passed. But the government failed to adopt the necessary measures for its execution; and transportation was resumed by a law passed in the 24th year of Geo. III., which empowered his majesty in council to appoint to what place beyond the sea, either within or without his majesty's dominions, offenders should be transported; and by two orders in council, dated 6th December, 1786, the eastern coast of Australia and the adjacent islands were fixed upon. In the month of May, 1787, the first band of convicts left England, and in the succeeding year they founded the colony of New South Wales.

The 5 Geo. IV. c. 84 (amended by the 11 Geo. IV., and 1 Will. IV. c. 39) authorized the king in council

'to appoint any place or places beyond the seas, either within or without the British dominions, to which offenders shall be conveyed, the order for their removal being left to one of the principal secretaries of state.' The places so appointed were the two Australian colonies of New South Wales and Van Diemen's Land; the small volcanic island called Norfolk Island, situated about 900 miles from the eastern shores of Australia; and Bermuda. To the governor of a penal colony was given a property in the services of a transported offender for the period of his sentence, and he was authorized to assign over such offender to any other person. The 9 Geo. IV. c. 83, empowered the governor to grant a temporary or partial remission of sentence; but the 2 & 3 Will. IV. c. 62, limited his power in this respect. In New South Wales and Van Diemen's Land convicts were subject to a variety of colonial laws, framed by the local legislatures established under the Act 9 Geo. IV. c. 83. The reception of convicts having, however, become distasteful to the colonists, an Act was passed, and came into operation in 1853, under which all sentences of transportation of less than fourteen years were abolished for the future, and 'penal servitude' substituted for them, the terms of the latter being considerably shorter than those of transportation. At the same time power was given to grant tickets-of-leave to convicts for good conduct in prison, but they were to be revocable during the unexpired term of the sentence. By a subsequent Act (1857) sentences of transportation were abolished altogether, and penal servitude substituted for them in all cases. These sentences of penal servitude have been carried into effect by detaining the convicts in separate confinement for about nine months; at the end of which period they have been removed for associated labour on public works. Since 1858 no convicts have been confined in hulks. In consequence of the general and well-founded complaints which were made throughout the country in the years 1860–63, as to the too indulgent treatment of convicts, and the general failure of the penal servitude system as a deterring or reformatory measure, a royal commission was appointed to investigate the whole subject. As the result of their labours another Act relating to penal servitude, and the one under which convicts are now dealt with, was passed in 1865, the 27 & 28 Vict. c. 47. The principal change in the law which is effected by this statute, is the abolition of sentences of penal servitude of four and three years, leaving the sentence of five years as the shortest that can be passed. This has had the effect of increasing the severity of the penal law, which, owing to the very frequent use of the short sentences referred to, had, in the opinion of the royal commissioners who investigated the subject, become too much relaxed. With the same object another very important provision is added, that a person convicted of a crime punishable with penal servitude, after having been previously convicted of felony, if the judge in his discretion thinks that the punishment of penal servitude should be inflicted, shall not be so sentenced for a shorter period than seven years. An important modification is also made in the convict system, in reference to the granting of remissions of sentence: instead of these being obtained as a reward of general good conduct as heretofore, they have now to be earned by industry alone; general good conduct (such as implicit obedience to all prison rules) is as indispensable as before, but of itself counts as nothing towards the obtaining a remission of a portion of the sentence; that can only be gained by steady and laborious industry, the degree of which is measured and recorded every day by the assignment to each convict of a certain number of marks—this system of marks having been adopted from the celebrated Irish method of convict treatment, which is fully described further on in this article.

A certain amount of remission is fixed as the maximum which can be attained by perfect industry, and the number of marks is so regulated that a convict must obtain the maximum number of marks every day (without any deduction for misconduct), in order to get the maximum remission. The sentence, therefore, is absolutely fixed up to a certain point, but may possibly extend beyond that point, and will inevitably do so unless the convict persistently and strenuously exerts himself.

The maximum period of remission for male convicts is a fourth part of that portion of the sentence which remains, after deducting nine months for separate confinement: *i.e.*, for instance, a person sentenced for ten years could not possibly obtain a remission of more than two years, three months, and three weeks. The scale applicable to females is somewhat less stringent, and by good conduct and industry they may obtain the remission of a third of that portion of the sentence which remains unexpired after they have served nine months in separate confinement. By the same Act an important change was also made in respect to the amount of gratuities allowed to convicts upon their discharge. The maximum which can be earned by the greatest possible industry was largely reduced, and is the same whatever may be the length of the sentence. By this means a defect properly pointed out in the former system has been obviated — viz., that prisoners who were under the heaviest sentences, in consequence of the enormity of their offences, received the largest sums of money from the public upon the recovery of their freedom. They now have no more than is considered necessary to enable them to live honestly until they can be reasonably expected to procure employment. With respect to convicts sentenced to penal servitude for life, they are considered as forming an exception to the rule that a remission of sentence may be earned by a regular course of industry, and in future their cases will never be taken into consideration at all until they have been confined at least twenty years.

In their report for 1867, the directors of the English convict prisons say they believe that the system now in force, of limited remissions of time, governed strictly by the measure of actual work performed, and forfeiture of advantages already gained in case of misconduct, is the true plan for dealing with convicts. They think the general state of the prisons now satisfactory. As before stated, on their first admission into prison the English convicts are now kept in separate confinement for nine months. During this term the prisoners are very extensively employed in mat-making, all the government offices being now supplied with mats by the convict department. The convict establishments in England also supply the convict depôts in Tasmania, West Australia, and Gibraltar with clothing, boots, and other articles, a large proportion of which are made up in the 'separate' prisons. The directors report that 'the effect of separation, especially upon hardened offenders, appears to be salutary, and from the eagerness evinced by the men for removal there can be no doubt it is regarded by them as a severe form of imprisonment.' After their removal the convicts are worked really hard (the value of the labour done by them at Chatham in 1866 more than covered the expenditure of the prison), and the dietary is no more than rigid

medical investigation justifies. The new system of classification, by means of marks, answers well; and communication between convicts, even on the public works, is scarcely practicable. Books of mere amusement, of an uninstructive character, are excluded from the library. Every infraction of discipline, especially violence to officers, and trafficking, which at one time was very rife, has been promptly punished; and on the other hand, the tendency of all the regulations is to encourage the convicts to industry and good conduct. As a rule, the prisoners conduct themselves in an orderly and satisfactory manner. They take an interest in their work, and in the daily rate of marks obtained, feeling that they have power to shorten their time in prison, and buy off so many months of their sentence; this is more to them than the amount of gratuity credited, and the forfeiture of marks for misconduct is more keenly felt than the ordinary punishments of bread and water in a solitary cell. A fair amount of progress is made in conveying to them the elements of instruction, without interfering with their work. An order is now enforced, that a convict to whom permission is granted to write to his friends must write his own letters. This has stimulated many to learn writing.

Pentonville and Millbank prisons are used for the imprisonment of convicts in separate confinement under the first stage of discipline, the former being for males only, the latter for both males and females; Chatham, Portland, and Portsmouth, for the convicts employed on public works, undergoing the second stage of discipline; Dartmoor and Woking for invalids; and Brixton, Fulham, and Parkhurst, for females after they have undergone the first stage of discipline. The Broadmoor asylum is devoted exclusively to criminal lunatics.

Parkhurst prison, which until recently was devoted exclusively to male convicts under sixteen years of age, is now given up entirely to females, the former not being so numerous as to require a separate establishment.

The treatment and reclamation of female convicts have always been attended with more difficulty than that of male prisoners. The women are chiefly employed in needlework of various kinds, knitting, laundry work, coir-picking, cooking, and baking. The inmates of the Brixton prison also make a very large quantity of clothing for the army, such as shirts, socks, handkerchiefs, &c. The mark system has been introduced into the female as well as the male convict prisons, and is found to work well. Formerly the best-behaved English female convicts spent the last portion of their time at Fulham, where they had somewhat more privileges than before; but six months before the expiration of their sentences they are now transferred from thence to the Carlisle Memorial Refuge, Queen's Square, Bloomsbury, if they are Protestants, and to the Eagle Refuge, Hammersmith, if they are Catholics. Both these institutions are conducted somewhat on the principle of the Irish intermediate prisons; *i.e.*, the prisoners have many privileges, and a certain amount of liberty, and they are specially trained in habits of self-reliance, so as to better fit them for contact with the world at the expiration of their sentences. In their last report the directors of prisons say, 'We have much pleasure in bearing testimony to the good results already apparent from the work undertaken by these two refuges, which have been admirably conducted with the best influence on the convicts.'

The state of the different convict prisons during the year 1866 is shown in the following table:—

Prisons.	Number at the Commencement of the Year.		Received during the Year, including Removals.*		Removed and Disposed of During the Year.		Remaining in Custody.		Daily Average.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
Pentonville,	488	—	56	—	749	—	495	—	461	—
Millbank,	818	123	156	26	1345	389	884	141	784	135
Portland,	1280	—	861	—	709	—	1432	—	1389	—
Portsmouth,	940	—	553	—	537	—	956	—	942	—
Chatham,	981	—	631	—	632	—	980	—	1045	—
Broadmoor,	87	—	92	—	179	—	—	—	78	—
Dartmoor,	584	—	377	—	334	—	627	—	613	—
Woking (Invalid Estab.),	546	—	442	—	331	—	657	—	613	—
Parkhurst,	—	396	—	109	—	280	—	225	—	263
Brixton,	—	504	—	295	—	299	—	500	—	479
Fulham Refuge,	—	81	—	198	—	158	—	121	—	103
Total,	5724	1104	3168	628	4816	1126	6031	987	5925	980

The total cost of the different convict establishments in the same year was 237,233*l.*, or an average of 34*l.* 7*s.* 4*d.* per head. Of this sum, however, 5*l.* 0*s.* 8*d.* was for fuel, light, buildings, &c., and 17*l.* 2*s.* 3*d.* for officers' salaries and allowances, leaving only 12*l.* 4*s.* 5*d.* per annum as the annual actual cost of the prisoners' diet and clothing.

Disposal of Convicts.—Now that scarcely any convicts are sent abroad, their disposal after the termination of their sentence is, in England, one of the most difficult questions connected with punishments, and for its settlement no thoroughly satisfactory measures have yet been adopted or devised. The best solution of the problem seems to have been found by the Prisoners' Aid Society, an institution founded in 1857, and which has never yet received the amount of public support and encouragement it deserves. Up to the end of 1867, a period of only ten years, it had taken under its protection more than 5500 men and women, for all of whom honourable employment has been found, or they have been assisted to emigrate to the colonies.

* The actual number of convicts sentenced to penal servitude during the year was only 2078—1791 males and 287 females, and the following figures show there has been a very gratifying decrease in both sexes since 1863.

MALES.

	Fresh Sentences.	Reconvictions.	Total.
1863	1964	644	2608
1864	1990	570	2560
1865	1424	511	1935
1866	1331	460	1791

FEMALES.

	New Convicts.	Reconvicted.	Revoked.	Total.
1863	354	114	25	493
1864	223	143	28	394
1865	170	88	29	287

The method adopted by the society is, shortly, as follows:—On a convict leaving prison there is given him, if he wishes it, a printed recommendation from the governor of the prison he has just left to the Prisoners' Aid Society. This document states the name and sentence of the applicant, his or her age, date of conviction, religion, education, number of previous convictions, character while in separate confinement, and (if a man) while employed on public works, trade, and degree of proficiency. It also states whether the prisoner is capable of hard labour, and gives name of former employer, place of abode, and family, what employment desired, and also the amount of gratuity due. Accompanying this document is a *carte-de-visite* of the prisoner, which is inserted in a sort of album kept by the society, and a paper is inclosed, giving details as to the colour of the eyes and hair, the height, and other physical peculiarities necessary to perfectly identify him in case of need.

As soon as respectable temporary homes (as far as possible from their old haunts) are found for the discharged prisoners, a small sum—sufficient to procure the means of subsistence and nothing more—is allowed them weekly from the gratuity earned during their incarceration, which must all be placed in the hands of the secretary immediately on their liberation. A decent outfit of clothes is then procured for them, and the society's officials employ themselves in finding situations for the women and such of the men as are adapted for domestic service, and employment in different trades and occupations for others. Those who from age or infirmity are not fit for manual labour, have small stocks in trade, such as fruit, vegetables, &c., provided for them, whereby they may obtain a living in the streets. But this last occupation is discouraged as much as possible by the society's officers, as it tends to encourage a wandering and vagabond life. Those of the men who have friends in the colonies (of whom there are a considerable number), are provided with free passages and outfits thither, if they are able to show that their friends are willing to receive and assist them on their arrival. Generally, these cases turn out remarkably well.

When a situation is found for a man, either in a private family or as an artisan, his previous history is told to his master under a pledge of secrecy, and the balance of his gratuity is turned over to the employer as a further guarantee for his good behaviour.

So long as the discharged prisoners remain in London the police have no control whatever over them; but the inspection of the convicts under the protection of the society is not one jot less stringent than if they were under such surveillance. Every fact concerning them is periodically forwarded to the office of the chief commissioner of police in Scotland Yard. These reports contain the name of each prisoner; the prison in which the latter part of his or her sentence was served; the date of liberation or license; the address of the house at which he is residing; the name of the place to which a license-holder intends to remove, if he purposes leaving the metropolitan district; and also the place to which any license-holder goes beyond the United Kingdom, together with the date of departure. The particulars of any failure of a license-holder to make the monthly report, or to give notice of changing his address, or of any one who violates the conditions of his license, and any further information that may be needed by the authorities, are carefully supplied.

Not only are convicts who are resident in London obliged to report themselves monthly at the society's office, but inspectors, men of unblemished character and great tact, daily visit one or more of the men who have found employment, and furnish to the secretary a written report of their proceedings. These are all entered in a book, which is kept with great care; so that there exists a complete history of every convict's life since he has been under the charge of the society.

In case of any disobedience, or of any one neglecting to give the monthly report of himself, information is immediately sent to Scotland Yard, and the defaulter is invariably removed from under the superintendence of the society, and placed under that of the police. This exercises a very salutary influence over the liberated convicts, for it is difficult to imagine anything more distasteful to them than the change. They know that, strict as are the regulations of the society, the members comprising it are their friends, and are actuated solely by kindly feeling towards them. The police, on the contrary, they look upon as their natural enemies; and they smart fearfully under any interference from them. The association is in constant communication with magistrates and clergymen throughout the kingdom, respecting the character of those whose cases it has undertaken, as well as their mode of life. A man who has conducted himself honourably, even though his ticket-of-leave may have expired, is still considered to be under the society's protection; and in cases of misfortune, not occasioned by the man's own misconduct, it is always ready to assist him to re-establish himself.

The Irish System of Convict Discipline.—The system pursued in the treatment of convicts in Ireland differs essentially from that of England, and its principles are now universally admitted to be the best that have yet been devised for the proper treatment and real reformation of criminals. It was introduced in November, 1855, but for nearly twenty years previously the main details of the scheme had been advocated by that great authority on prison discipline, Mr. M. D. Hill, recorder of Birmingham, and were subsequently warmly supported by Lords Brougham and Stanley, Sir J. Pakington, and others. To Sir Walter Crofton, C.B., who was at the time chairman of the directors of convict prisons in Ireland, is, however, to be chiefly attributed the success which has attended the operation of the scheme during the twelve years it has been in existence—a success which has demonstrated beyond all doubt the truth of those moral principles which are so embodied in it as to constitute its principal feature, and of the excellence of the machinery by which they are brought into action. In fact, so satisfactory have been its results that the plan has elicited the warm approval of many distinguished continental jurists, and some of its main features have been adopted in more than one country.

The general principles which govern the Irish convict system are thus very briefly stated by Sir W. Crofton:—

1st. That convicts are better and more reliably trained in small numbers, and by their being made to feel throughout their detention that their advancement depends on themselves, through the active exercise of qualities opposed to those which have led to their imprisonment.

2nd. That the exhibition of the labour and training of the convicts in a more natural form, before liberation, than is practicable in ordinary prisons, is a course obviously calculated to induce the public to assist in their absorption, and thereby to materially diminish the difficulties of the convict question.

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3rd. That the institution of appliances to render the criminal calling more hazardous will assuredly tend to the diminution of crime; and, therefore, that 'police

supervision, photography, and a systematic communication with the governors of country gaols, with a view to bring, in all possible cases, former convictions against offenders, and entail lengthened sentences upon them, are matters of the gravest importance, and deserving of the most minute attention.'

To secure these various ends the following is the treatment now pursued with respect to all Irish convicts:—

First Stage.—Separate imprisonment in a cellular prison at Mountjoy, Dublin, for the first eight or nine months of the sentence. Whether the period is eight or nine months, or even longer, depends upon the conduct of the convict. If his conduct is quite unexceptionable, he is entitled to be removed to an associated prison (the second stage) in eight months.

In Ireland it is the practice to make this stage *very penal*, both by a very reduced dietary during the first half of the period—for four months no meat whatever being allowed to the prisoner—and by the absence of interesting employment during the first three months. This penal treatment is enforced to impress upon the convict as much as possible the gravity of his offence against society. By the time he is required for hard work in the second stage, the improved dietary in the latter portion of the period in separation has rendered him physically equal to perform it; and by the end of three months of the first stage, the idler has generally learned to associate industry with pleasure.

The convict learns something very material to his future well-being in the first stage; he has the advantage of much time devoted to his religious and secular instruction. He learns the whole bearing of the 'Irish Convict System' by means of scholastic instruction—that he can only reach the intermediate prisons (a special feature and a third stage in the system) through his own exertions, measured by marks in the second stage of the system. As the liberation of the convict within the period of his sentence depends upon the date of his admission to the intermediate or third stage of the system, it is manifestly to his own interest, as it is the interest of those placed over him, that he should be well informed upon this point. There is a strong mental impression made consequent on this information.

As the convict attains knowledge of the system he feels that, within certain limits, he is made the arbiter of his own fate. Antagonism to the authorities placed over him gradually disappears, and in its stead arises a conviction that there is a co-operation where he had formerly anticipated oppression. The first stage has done good work, if it has succeeded in planting in the mind of the convict that there is an active co-operation existing between himself and those placed over him. At the end of eight or nine months, as the case may be, the convict is moved, if a labourer, to Spike Island prison, to be employed on the fortifications, and if a tradesman, to Phillipstown, to be employed at his trade.

Second Stage.—The peculiar feature of the Irish convict system in the second stage, is the institution of marks to govern the classification. The 'mark system' is a minute and intelligible monthly record of the power of the convict to govern himself, and very clearly realizes to his mind that his progress to liberty within the period of his sentence can only be furthered by the cultivation and application of qualities opposed to those which led to his conviction.

There are different classes to be attained in the second stage, and a certain number of marks are required to be obtained by the convict before he can be promoted from one class to another. The maximum number of marks each convict can attain monthly is nine, which are distributed under three different headings—viz., three for discipline, *i.e.*, general regularity and orderly demeanour; three for school, *i.e.*, the attention and desire evinced for improvement, or industry in school; and three for industry, *i.e.*, industry at work, and not skill, which may have been previously acquired.

There are four classes in the second stage—viz., the third (in which the convict is placed on his arrival from the first stage), the second, first, and advanced, or A class. It is possible for a convict to raise himself from the third to the second class in two months, by the acquisition of eighteen marks; from the second to the first in six months, if he has attained fifty-four marks in the second class; and from the first to the A, or advanced class, in twelve months, provided he has acquired 108 marks in the first class. When the convict has reached the A class his conduct is noted monthly, as A 1, A 2, &c. Misconduct causes reduction, suspension, or the loss of marks. When the convict attains the A class he is employed (although still in the second stage of his detention) on special works, and kept apart from the other convicts. His school instruction and lectures take place in the evening.

It will be readily understood that the man most successful in climbing the ladder of self-control and industry, will the soonest obtain the required number of marks, and the goal to which they lead—viz., the intermediate prisons—and afterwards the liberty for which the convict is supposed to have been made fit by the lessons of those good schoolmasters, industry, self-control, and self-reliance, succeeded by a very special and natural training. The earliest possible periods of removal to intermediate prisons apply only to those of the most unexceptionable character, and no remissions of the full sentence take place unless the prisoner has qualified himself, by carefully measured good conduct, for passing the period in the intermediate prisons prescribed by the rules; and any delay in this qualification has the effect of postponing his admission into the intermediate prisons, and deferring to the same extent the remission of a portion of his sentence.

However trifling the 'mark system' may appear to those not conversant with its operation, it is found in practice to realize to the mind of each individual very clearly and fully his progress in self-government, and in other desirable qualities. There is not an intelligent officer in the Irish convict department who will not bear witness to the intense interest taken by each convict in the attainment of his marks, and the jealous care with which he notes them; for each convict is allowed to keep a check on the officials as to the number of marks he has obtained.

The Third, or Intermediate Stage.—In this stage there are no marks. The result of the self-discipline effected by their attainment is here to be tested before the liberation of the convict. 'Individualization' is the ruling principle in these establishments; the number of inmates is therefore small, and never exceeds 100. The training is special, and the position of the convict made as natural as possible; no more restraint is exercised over him than would be necessary to maintain order in any well-regulated establishment. At Lusk Common, within 15 miles of Dublin, there has been for the last ten years an intermediate establishment for employing convicts in the reclamation of the land, and for carrying out principles which have proved so beneficial to themselves and to the public. Many convicts are also employed at other kinds of work in or near Dublin,

often being allowed to be absent by themselves the whole day.

The officers in the intermediate establishments work with the convicts. At Lusk there are only six, and they are unarmed. Physical restraint is therefore impossible, and if possible, it would be out of place, and inconsistent with the principles which the establishments were instituted to enunciate. First, you have to show to the convict that you really trust him, and give him credit for the amendment he has illustrated by his marks; second, you have to show to the public that the convict, who will soon be restored to liberty for weal or for woe, may, upon reasonable grounds, be considered as capable of being safely employed. How does this become possible? The reply is, that the convict is co-operating in his own amendment. He cannot ignore the conviction, sooner or later, that the system, however penal in its development, is intended for his benefit; and that, moreover, it has by its stringent regulations and arrangements after the liberation of the convict, and this is most important to note, made the vocation of crime very unprofitable and hazardous to follow.

He has lectures of an interesting and profitable description, which not only point out the wickedness and the danger of criminal pursuits, but show him the course which he should take in order to amend his life, where his labour is required, and his antecedents not likely to entice him to his ruin. The mind of the convict is in alliance with the minds of those placed over him, and what at first sight might have appeared to be impracticable has become for many years a recorded and gratifying fact.

It is not averred that every convict is in these establishments bent upon well-doing, but that the tone of general feeling is that of desiring to amend, and is in the closest alliance with the system.

It is evident that this result is the attainment of an enormous power, which it would be impossible to secure by mere routine or mechanical appliances. The convict has felt the intention of the system, the scope of which has been made clear to his mind—that he is an individual whose special case and progress is noted, and very carefully watched in its development.

A convict has no gratuity in separation, but he has 1*d.* a week in the third class, 2*d.* a week in the second class, and 3*d.* and 4*d.* in the first class, which is divided. In the advanced or A class it is from 7*d.* to 9*d.* per week. In the intermediate prison, by dint of great industry, he may earn as much as 2*s.* 6*d.* per week, out of which, if he chooses, he is allowed to spend 6*d.* per week in anything he likes, except intoxicating drinks, which are very strictly prohibited. All the remainder of the money which he has earned is placed to his credit (he keeping a check on the authorities if he likes), and paid to him when he is discharged.

On his discharge every convict receives a license endorsed with the following conditions, which, in Ireland, are very stringently enforced; a course which has proved to be most beneficial both to the public and the convicts:—

1. The power of revoking or altering the license of a convict will most certainly be exercised in case of his misconduct.

2 If, therefore, he wishes to retain the privilege which by his good behaviour under penal discipline he has obtained, he must prove by his subsequent conduct that he is really worthy of her Majesty's clemency.

3. To produce a forfeiture of his license it is by no means necessary that the holder should be convicted

of any new offence. If he associates with notoriously bad characters, leads an idle and dissolute life, or has no visible means of obtaining an honest livelihood, &c., it will be assumed that he is about to relapse into crime, and he will be at once apprehended, and recommitted to prison under his original sentence.

The regulations for the enforcement of these conditions are:—

1. Each convict will report himself to the constabulary station of his locality on his arrival in the district, and subsequently on the first of each month.

2. A convict must not change his locality without notifying the same at his constabulary station, in order that his registration may be changed to the locality to which he is about to proceed.

3. An infringement of these rules by the convict will cause it to be assumed that he is leading an idle and irregular life, and thereby entail a revocation of his license.

It will be thus seen that for a time the discharged convict is kept under the eye of authority, but in most cases this supervision only tends to confirm the good intentions it is presumed he made before he left prison, in the checks which it puts upon him, and the apprehension of the evil consequences of a return to crime. But, more than this, the continuing guardianship is not all repressive. To the liberated convict it is a protection against the influence of those who would turn him back to wickedness; and it gives him a shield against many mischiefs and many misconceptions, which would be entailed by his tainted character, if he had not the opportunity of appeal to the officers of justice as to his changed life and renewed trustworthiness.

In addition to the supervision of the police, there is a special inspector of released convicts. It has been already stated that, during their confinement in the intermediate prisons, the convicts attend lectures on useful subjects. They are delivered by Mr. Organ, a gentlemen who has been identified with the system from its commencement, and who is admirably adapted for his situation. In a paper he read on the subject at the Social Science Congress at Belfast, in 1867, he said he soon found that it was only by reaching the hearts of the men and establishing a species of fellowship between himself and them, that he could make himself thoroughly acquainted with their minds, dispositions, and intentions; and possessed of that knowledge he was better prepared to soften, if not remove, the prejudices of their distorted minds, and battle, as it were, with their sluggish and sunken intellects. He was enabled at last to prove to the most sceptical and ignorant that there were men heartily interested in their welfare, willing to forgive and forget the past, and none more deeply concerned in their amendment than the very government which they once looked upon as their foe. On their release from prison this gentleman endeavours to procure employment for them, and exercises a friendly inspection over them, visiting them fortnightly as long as they remain in the county of Dublin. At first it was exceedingly difficult to obtain employment; but since the thorough reform effected in most of the criminals by their judicious treatment has become more and more apparent, the task has become comparatively easy. In fact, perhaps one of the best proofs of the results of the system is the grand fact that even in their own county the late criminals are willingly received back into society, and are able to gain an honest livelihood; that employers are not afraid to give them work, and even place them, after suitable probation, in situations of trust. Tangible proofs of its

success can also be given in the very remarkable reduction of crime in the island, and the very small proportion of the relapses. The following table shows the number of convicts, respectively, in custody, convicted, and discharged, since the year before the commencement of the system :—

Year.	In Custody in Government Prisons, 1st January.	Convicted.	Number Discharged.
1854	*3933	710	658
1855	3427	518	820
1856	3209	389	1107
1857	2614	426	910
1858	2277	358	946
1859	1773	372	595
1860	1631	331	524
1861	1492	368	561
1862	1314	592	317
1863	1575	511	326
1864	1768	407	391
1865	1776	299	410
1866	1637	†265	439
1867	1431	—	—

The exceptional increase in the years 1862-63 may be fairly attributed to the great distress which then prevailed in many parts of the country, in corroboration of which it may be stated that the numbers confined in the county and city prisons also increased in those years, and that there was also a considerable increase in the number of paupers. In 1866 the number of male convicts whose licenses were revoked for breach of conditions was ten; for new offences, fourteen: females —revoked for breach of conditions, seven; for new offences, none. Considering the very stringent manner in which the conditions on which a license is granted to a convict are carried out in Ireland, these numbers are certainly remarkably small. It may here be proper to observe that convicts under life sentences, or whose crimes have been of a specially grave character, cannot by any degree of prison conduct attain to the advantages of the intermediate prisons, and that reconvicted prisoners who have had those advantages during their former sentences, are also invariably excluded.

The Irish female convicts are treated on the same judicious principles as the males, so far as is practicable. In consideration of their greater susceptibility the time of separate confinement at the commencement of their sentence is only four months instead of eight—conditional, of course, on their good conduct and industry; if they are not satisfactory the time is extended. They must afterwards pass through the various classes of the second stage, in which the arrangements as to marks and their advancement depending on themselves are similar to those for males. In both the first and second stages, however, they are allowed to be visited by ladies of their own religious persuasion, under judicious regulations—another peculiar feature of the Irish prisons, and one which has been attended with much success. For some time it was a difficult problem how to supply the last or 'intermediate stage' in the case of females, as women could not with safety be allowed as much liberty as men—the dangers of the streets to females, especially of this class, would render such liberty most unsuitable. The difficulty has been solved by placing the Catholic prisoners—who form the large majority —in a penitentiary at Golden Bridge, conducted by

* In addition to this number there were 345 convicts under detention in the county prisons, and several hundred in Bermuda and Gibraltar, who were subsequently discharged in Ireland.

† Nineteen of these are military convicts.

nuns, and the Protestants in an institution in Dublin, superintended by ladies of that faith. They are still under their sentence of detention, and subject—as the men are at Lusk—to be sent back to Mountjoy should their conduct prove unsatisfactory, and they are also under the constant inspection of the directors of prisons. As a rule the women work very cheerfully and actively, and all the moral influence which it is possible to bring to bear upon them is used with the view of encouraging habits of self-reliance and rendering them fit to be trusted on their discharge. The plan has answered admirably; the women feel and appreciate the kindness which is shown them, and go forth again to the world in a very different position from what they could possibly have done from any prison. The public, too, have confidence in the characters which they receive of them from the ladies who superintend the institutions, and hence are not unwilling to receive them into domestic service.

Prisons (*Prison*, French) are places of safe custody, of punishment, and of reform.

The history of practical improvements in the prisons of this country begins with HOWARD. He was not, however, the first to expose the vices of the old system. His biographer has discovered a document in the archives of the Christian Knowledge Society, which shows that in the reign of Queen Anne a well-conceived attempt was made to reform the London prisons by Dr. Bray and other members of that association; but the task was found to be so gigantic and so repulsive, that after a short effort it was entirely abandoned. The description of the management of Newgate there given comprises: —'1, the personal lewdness of the keepers and under-officers, who often make it their business to corrupt the prisoners, especially the women; 2, their confederacy with prisoners in their vices, allowing the men to keep company with the women for money; 3, the unlimited use of brandy, wine, and other strong liquors, even by condemned malefactors; 4, swearing, cursing, blasphemy, and gaming; 5, old criminals corrupting new comers; 6, neglect of all religious worship.' A quarter of a century later public attention was again directed to the state of the metropolitan gaols by some dreadful reports which got abroad: a parliamentary inquiry took place under the direction of General Oglethorpe, and the revelations which it made as to the cruelties exercised in prisons, and the fearful immorality of all parties connected with them, produced a strong impression on the public mind. A change of keepers then took place, and some amendments were introduced into gaol administration; but the chief vices of the system remained until the time of Howard (Dixon's 'Life of Howard,' c. i.) In the first section of his work on 'The State of Prisons in England and Wales,' which he entitles 'A General View of the Distress in Prisons,' published in 1775, Howard presents a summary of the abuses which existed in the management of criminals at that time. These abuses related to food, ventilation, drainage, and want of classification of the prisoners, the effects of which were disease and the further corruption of all persons who were confined in prisons.

The labours of Howard and others were slowly attended with success. Nearly fifty years afterwards, there still existed many prisons in the same condition as that in which Howard left them—monuments of the justice of his statements, and of the indifference with which his recommendations had been regarded. In 1818 it appears, by parliamentary returns, that out of 518 prisons in the United Kingdom, to which upwards

of 107,000 persons were committed in that year, twenty-three prisons only were classed or divided according to law; fifty-nine had no division whatever to separate males from females; 136 had only one division for that purpose; sixty-eight had only two divisions, and so on; and twenty-three only were divided according to the regulations of the statute (24 Geo. III. c. 54, sec. 4). In 445 prisons no work of any description had been introduced; in seventy-three, though some work was performed, yet the number was exceedingly small in which employment had been carried on to any extent. In 100 gaols built to contain only 8545 prisoners, there were 13,057 persons confined.

During the last half century, however, most important reforms have been effected. The first effort was to obtain some sort of classification of prisoners. Hopes were entertained that this system of classifying was the one thing needed, but it soon proved an absolute failure; for although there is a natural basis for it in the difference of age and sex, it was very soon perceived, when the plan was practically carried out, that the desideratum was a moral, not a material classification, and for this no certain basis could be discovered, either in nature or legal decision.

This plan of classification failing, the advocates of a reform in the old and insufficient modes of criminal treatment, took up with the *Silent System*, supposing that contamination would be prevented by the intercourse of the tongue being prohibited. The first objection to the execution of this plan was the expense of employing a requisite number of officers to enforce silence. To mitigate or get rid of this objection, the practice of giving to prisoners a control over other prisoners was introduced. In the larger class of prisons, particularly those in London, this part of the plan was afterwards abandoned, and has since been given up all through the country. It is not easy to characterize the silent system of prison discipline in a few words, for it has undergone considerable alteration since its introduction. The silence is now the least part of it, and the only word that will truly indicate its leading characteristic is the associated-silent-labour system. At first the treadwheel, the crank, and the oakum-room, were the only employments; gradual innovations have been made in this respect, until we find nearly all the ordinary trades—carpentry, tailoring, shoe-making, mat-making, baking, &c.—pursued, and in many instances actually taught, within the prison by well-paid instructors.

All prisons in England and Wales are now regulated by 28 and 29 Vict. c. 126, which was passed to amend and consolidate the previous laws on the subject. Distinct divisions of the gaol are appropriated to males and females. The several wards, cells, yards, &c., are devoted to distinct classes of inmates, and the whole prison must be kept scrupulously clean in every respect. There are baths for the cleansing and bathing of prisoners; and a fumigating oven for the cleansing and disinfecting of their clothes, linen, or bedding. A competent number of cells adapted to solitary confinement for the punishment of 'refractories,' and for the reception of such as may by law be sentenced to confinement therein, is provided. Separate rooms are fitted up as infirmaries or sick wards for the two sexes, and as far as possible for the different descriptions of prisoners. Every inmate is provided with suitable bedding, and every male with a separate bed, hammock, or cot, either in a separate cell, or in a cell with not less than two other male prisoners. Convenient places are set apart for washing, combing, &c., and yards for exercise. It

is provided by law that the visiting justices appointed at quarter-sessions shall meet periodically at the prison and inspect the several journals, registers, and books, and give such directions as may to them seem necessary; that they shall regulate a scale of fines to be levied by the governor upon the subordinate officers for negligence in the performance of their duties; that they may suspend any official, examine from time to time the state of the buildings, the classification, separation, inspection, hard labour, employment, health, diet, instruction, &c., of the prisoners; also into the amount and disposal of their earnings, the expenses attending the prison, and any improvement which may be practicable; they are also required to direct such books as they think proper to be distributed for the use of the inmates who do not belong to the Established church; they may enter into contracts for the employment of prisoners in any work or trade within the gaol, subject to the sanction of the general or quarter sessions; they may authorize any offender to be employed in the service of the prison, but not in that of any officer in control or instruction of any other prisoner; they may order necessary clothing to be given to any man on his discharge, or may pay his passage home, or present him with such a moderate sum of money as they may think fit; they are required to make a report respecting the state of the prison at every quarter sessions; in case of contagious disease, or any other emergency, they are empowered to issue an order under their hands or seals, to remove the prisoners to some other prison or place of confinement within their jurisdiction; in case of any criminal prisoner being guilty of repeated offences against the rules of the prison, or of any greater offence than the governor is authorized to punish, a visiting justice may order the offender to be punished by solitary confinement, and in case of absolute necessity, by confinement in irons; and he must, on the other hand, receive and investigate the complaint of any prisoner. Spirits, wine, beer, and tobacco, are prohibited to any inmate, excepting in cases approved of by the surgeon. For every prison it is provided that there shall be a governor, chaplain, and surgeon; and for the female branch of the prison, a matron; and such subordinate officers as may be necessary; none of whom, excepting the chaplain and surgeon, are allowed to hold any office or have any occupation except what refers to the prison. The chaplain must belong to the Church of England, but in prisons where the number of inmates warrant such a step being taken the magistrates may also appoint a Roman Catholic chaplain, and fit up a separate place of worship for the prisoners of that persuasion. Prisoners of other religious denominations may be visited by ministers of their own denomination at specified times, subject to the approval of the governor.

A different dress is worn by a prisoner convicted of felony from one convicted of a misdemeanor: he is employed, unless prevented by sickness, at such hard labour as can be provided, and for so many hours (not exceeding ten) daily, except on Sundays, Christmas-day, Good-Friday, or any public feast or thanksgiving day. Some descriptions of misdemeanants are allowed to wear their own clothing, if deemed sufficient and proper; and they have various other privileges. Prisoners convicted of felony, but not sentenced to hard labour; misdemeanants who do not come under the description contemplated in the above detail; and other convicted offenders not sentenced to hard labour must be clothed in a particular dress, and employed in some work or labour which is not severe; and they are restricted to a

prison diet. They are required, like all other prisoners, excepting misdemeanants of the first division, to preserve silence.

While the experiment of silent association of prisoners was in course of trial in this country, a new plan—the isolated—was attempted in the United States. At first, from keeping the prisoners in perfect solitude, the most frightful results followed. Some went mad; some became idiotic; and some contrived to put an end to their existence: the rest had all to be pardoned and set at liberty. This gave the public a horror of isolation. A minor form of the same species of punishment was then tried, under the name of the *Separate System*, which differs in many essential particulars from the silent system. It originated in this country as early as the year 1790, and was first tried in the county gaol at Gloucester. This building was provided with cells, in which prisoners were confined apart, day and night. Those under short sentences were denied, while those under long sentences were provided with, employment. Moral and religious instruction was given in the cells and in the chapel. This discipline was enforced during seventeen years, in which period there were very few recommitments. But the increase of population demanding increased prison accommodation, the system was abandoned to make room for additional prisoners. In 1811 the favourable opinion conceived of separation in prisons by a committee of the House of Commons led to a recommendation 'that a separate prison should be erected in the first instance, for the counties of London and Middlesex, and that measures should be taken for carrying on the penitentiary system, as soon as might be practicable, in different parts of the country.' In the following year (1812) the Act 52 Geo. III. c. 44, was framed in conformity with the committee's recommendation, by which Act the penitentiary at Millbank was commenced in 1813—subsequent Acts granting leave to increase its accommodations. In 1821 this great prison was completed for the reception of 1200 convicts, for England, Scotland, and Wales. The separate system did not begin to be carried out for some years after its establishment, and it was partially abandoned, owing to the great mortality which then prevailed.

A model prison on the separate plan was subsequently erected at Pentonville, London, and many others have since been built in different parts of England. In fact, this method is now being carried out in a more or less modified form in almost every prison in the country.

Prisoners committed for trial or for examination are permitted to wear their own clothing in prison, provided it be sufficient; they may also procure their own food, bedding, &c., subject to necessary examination; they are kept apart from the other prisoners, and are not compelled to work or labour; but at their own request or with their own consent may be supplied with any work not severe. Provided no bill has been found against a prisoner, or that upon his trial he has been acquitted, he is allowed such a proportion of the amount of his earnings as the visiting justices deem fit and reasonable. Prisoners of this class are permitted to see their friends without any order, within specified hours; and their legal adviser at any reasonable hour. Letters to and from them are subject to the inspection of the governor. They are liable, in case of their being riotous or disorderly, or being guilty of a breach of the regulations, to be more strictly confined, and be allowed no other food than bread and water.

There was formerly no further distinction observed in the discipline of juvenile offenders than by their separate classification from the adults in the hulks, prisons, &c., where they were put to the same or nearly the same routine of duties as the adults: but with the establishment of the Parkhurst Reformatory, in the Isle of Wight, the commencement of systematic improvement in this respect was made, and having been attended with the best results, it has since been considerably extended. [REFORMATORIES.] The objects sought to be attained at these institutions are the proper correction of boys with a view to deter juvenile offenders generally from the commission of crime, and their moral reformation. That they have already exercised a beneficial influence on the juvenile population of the lower orders can hardly be doubted, and that their benefits will be still greater in proportion to their more extensive development, may also be reasonably hoped. (See also *Industrial Schools* in the article SCHOOLS.)

The home secretary is empowered to appoint a sufficient number of persons to visit and inspect, either singly or together, every gaol, bridewell, house of correction, penitentiary, or other prison or place for the confinement of prisoners in any part of Great Britain; and to examine officers, inspect books and papers, and inquire into all matters relating to the management and discipline of such place of confinement, and to deliver to the secretary of state a report thereon.

Criminal Statistics—England and Wales.—From the criminal tables prepared at the Home Office, and annually presented to Parliament, it seems clear that the amount of crime in England and Wales has diminished in the last twenty-five years in its ratio to the population, but the decrease has been so small as certainly to afford no grounds of self-congratulation. In fact, during the years 1861-63, a considerable increase of serious crimes was shown by the returns, and was attributed by the commissioners appointed to inquire into the subject at the close of 1862, partly to the defective system of secondary punishment in force, and partly to the accumulation of discharged convicts at home in consequence of the small number sent to a penal colony since 1853.

At the taking of the census on the 8th April, 1861, the number of prisoners detained in England and Wales in the convict establishments, county and borough prisons, gaols, bridewells, houses of correction, and reformatories certified by the secretary of state for the reception of youthful offenders under the Act of 17 & 18 Vict. c. 36, was 26,096, viz., 21,177 males and 4919 females. Of these some few were insolvent debtors (bankrupts), and a considerable number were awaiting their trial, but the majority had been convicted and were undergoing sentence. The ratio of prisoners of all classes to the general population was 1 in 769. At the census of 1851 the aggregate number was 23,768, and the ratio 1 in 754. In every 10,000 males and as many females in England and Wales in 1861, there were in prison about 22 males and 5 females; in 1851 there were 23 males and 4 females.

As regards the ages of prisoners, the returns for 1851 and 1861 present the following results:—

	1851.		1861.
Under 20 years, . .	5,976	...	6,281
20 and under 60, .	17,280	...	19,166
60 and upwards, .	512	...	649
Total, . .	23,768	...	26,096

The following return shows the population of England and Wales, with the convictions, licenses, and transportations from them since 1834:—

Year.	Population.	Sentenced to Imprisonment.	Sentenced to Transportation or Penal Servitude.	Number Released on License.
1834	14,520,297	10,721	3,060	—
1835	14,724,063	9,915	3,629	—
1836	14,928,477	10,125	3,611	—
1837	15,103,778	12,294	3,785	—
1838	15,287,699	12,927	3,696	—
1839	15,514,255	12,927	3,696	—
1840	15,730,813	15,110	3,105	—
1841	15,929,472	15,747	3,800	—
1842	16,130,326	17,871	4,481	—
1843	16,332,228	16,275	4,488	—
1844	16,535,174	14,189	3,651	—
1845	16,739,136	14,052	3,247	—
1846	16,944,092	14,902	3,157	—
1847	17,150,018	18,312	3,262	—
1848	17,356,882	19,175	3,600	—
1849	17,564,656	17,761	3,202	—
1850	17,773,324	17,602	3,173	—
1851	17,982,849	18,418	3,338	—
1852	18,193,206	18,441	2,896	—
1853	18,404,368	18,130	2,709	305
1854	18,616,310	20,388	2,742	1,805
1855	18,829,000	17,397	2,590	2,462
1856	19,042,412	11,885	2,715	2,055
1857	19,256,516	12,507	2,841	690
1858	19,471,291	10,834	2,419	299
1859	19,686,701	10,060	2,383	215
1860	19,902,713	9,656	2,436	703
1861	20,119,314	11,233	2,678	1,614
1862	20,400,000	11,944	3,369	1,832
1863	20,600,000	12,251	3,071	1,764
1864	20,900,000	11,948	2,445	2,425
1865	21,100,000	12,358	2,081	2,254
1866	21,300,900	11,582	2,016	1,802

The following were the nature and number of the crimes committed (so far as known to the police) in England and Wales, during the year ending September 29, 1866:—

	Number of Crimes Committed.	Number of Persons Apprehended.
No. 1.—Offences against the Person.		
Murder,	131	124
Attempts to murder,	45	45
Shooting at, wounding, stabbing, &c. to do bodily harm,	679	671
Manslaughter,	259	315
Attempts to procure miscarriage,	8	11
Concealing the birth of infants,	211	151
Sodomy and bestiality,	118	122
" attempts to commit, and other unnatural misdemeanors,	37	41
Rape,	257	276
" assaults, with intent to ravish and abuse,	322	320
Bigamy,	94	85
Child stealing,	16	17
Unlawfully abandoning children under two years of age,	41	18
Assault and inflicting bodily harm,	272	248
Assaults, common,	207	201
Assaults on peace officers,	164	241
Total of No. 1,	2,861	2,896
No. 2.—Offences against Property with Violence.		
Sacrilege,	92	25
Burglary and house-breaking,	2,708	1,423
Breaking into shops, warehouses, &c.,	1,085	446
Attempts to break into houses, shops, warehouses, &c.,	447	81
Robbery on the highway,	680	622

	Number of Crimes Committed.	Number of Persons Apprehended.
Attempts to rob on the highway, and demanding money by menaces,	69	72
Threatening by letter, with a view to extort money,	7	7
Total of No. 2,	5,088	2,676
No. 3.—Offences against Property without Violence.		
Cattle stealing,	34	29
Horse stealing,	224	176
Sheep stealing,	367	135
Larceny to the value of £5 in Dwelling-houses,	1,086	645
Larceny from the person,	7,535	3,251
Larceny by servants,	2,461	1,289
Larceny, simple,	22,519	9,577
Larceny on rivers, canals, wharfs, &c.,	569	258
Stealing fixtures, shrubs growing, &c.,	96	39
Attempts to steal,	242	99
Embezzlements,	1,077	922
Larceny by servants in the post office,	30	31
Receiving stolen goods,	757	861
Fraudulently obtaining goods by false pretences, and attempts to defraud,	1,834	1,413
Total of No. 3,	39,731	18,725
No. 4.—Malicious Offences against Property.		
Arson, and other wilful burning,	332	298
Felonious riot and demolishing buildings, &c.,	2	18
Destroying goods in process of manufacture,	3	3
Destroying trees, shrubs, &c., growing,	15	4
Killing and maiming cattle,	45	18
Sending letters threatening to burn houses, &c.,	3	2
Malicious injuries to property exceeding £5 in value,	22	24
Other wilful and malicious injuries to property,	43	31
Total of No. 4,	465	398
No. 5.—Forgery and Offences against the Currency.		
Forging and uttering forged instruments,	211	200
Having in possession forged Bank of England notes,	2	1
Coining, and having in possession implements for coining,	17	22
Uttering, putting off, and having in possession counterfeit coin,	969	845
Total of No. 5,	1,199	1,068
No. 6.—Offences not included in the above Classes.		
Offences against the game laws,	56	117
Being at large under sentence of transportation or penal servitude,	9	8
Perjury,	124	128
Riot, breach of the peace, &c.,	44	164
Keeping disorderly houses,	61	75
Indecently exposing the person,	23	25
Suicide, attempting to commit,	638	636
Other felonies,	122	109
Other misdemeanors,	128	165
Total of No. 6,	1,205	1,427
Total of England and Wales,	50,549	27,190*

It will be thus seen that the number of indictable offences committed in 1866 almost doubled the number of apprehensions, and far more than doubled the num-

* Of this number 8341 were discharged, and 18,849 committed for trial.

ber of prisoners sent for trial. The proportions of apprehensions to the number of crimes committed was, in 1866, 53·7 per cent.; in 1865 it was 55·6 per cent.; in 1864 it was 56·2 per cent.; and in 1862 58·2 per cent. Evidently, then, it appears that the more crimes that are committed the smaller is the proportion of persons apprehended. In fact, three out of every five crimes of this class go unpunished, and if the crimes which are never reported to the police at all are taken into consideration the chances of impunity would prove to be much greater. There is, however, an important distinction between offences against the person and those against property. The former can generally be proved conclusively by the evidence of the prosecutor, and thus whereas a large proportion of arrests for offences against the person terminate in conviction, but a small proportion of those apprehended for offences against property

are committed for trial. Although the number of convictions, as compared with that of the offences committed, is so small, it cannot be said that the police force of the country is not reasonably sufficient. Altogether in 1866 there were maintained in England and Wales 23,728 constables, at a cost of 1,827,105*l.*, of which 441,947*l.* is defrayed from the public revenue. There is, therefore, one policeman for every 893 of the estimated population, and as special constables are always sworn in on serious emergencies, this body of 23,728 officers represents what may be called a peace establishment.

In addition to the indictable offences in 1866, the cases of no less than 481,770 persons were disposed of by magistrates—142,679 being discharged, and 339,091 convicted, and either fined or imprisoned. Their characters were thus given by the police:—

Characters.	Apprehended for Indictable Offences.		Proceeded against Summarily.		Total.		
	Males.	Females.	Males.	Females.	Males.	Females.	M. & F.
Known thieves,	4,179	1,145	10,927	2,717	15,106	3,862	18,968
Prostitutes,	—	1,201	—	16,503	—	17,704	17,704
Vagrants, tramps, and others without visible means of subsistence,	604	133	14,309	4,661	14,913	4,794	17,707
Suspicious characters,	4,937	1,071	33,549	5,381	38,486	6,452	44,938
Habitual drunkards (not under the above heads),	386	101	24,132	6,862	24,518	6,963	31,481
Previous good character,	4,813	1,137	175,007	19,870	179,820	21,007	200,827
Character unknown,	5,765	1,718	135,257	32,595	141,022	34,313	175,335
Total,	20,684	6,508	393,181	88,589	413,865	95,095	508,960

The actual number of prisoners under detention in the 143 local prisons of England and Wales during the year ending September 29, 1866, was:—

	Males.	Females.	Total.
Number in prison at the commencement of the year:—			
Criminals,	13,895	4,123	18,018
Debtors,	466	29	495
Total,	14,361	4,152	18,513
Committed during the year:—			
Criminals,	91,420	32,871	124,291
Debtors,	11,949	501	12,450
Total,	103,369	33,372	136,741
Remaining in prison at the end of the year:—			
Criminals,	13,221	3,735	16,956
Debtors,	545	31	576
Total,	13,766	3,766	17,532

Greatest number at any one time—Males, 17,293; Females, 4,735; Total, 22,028. Daily average—Males, 14,068; Females, 3,781; Total, 17,849.

The cost of maintaining the different prisons amounted to 614,678*l.*; the average yearly charge per prisoner under each head being:—

	£	s.	d.	£	s.	d.
Buildings and fittings—						
Extraordinary charges,	8	10	9			
Ordinary annual charges,	6	7	7			
				14	18	4
Officers and attendants,				11	11	7
Prisoners' diet,				5	14	11
Clothing, &c.,				2	3	10
				34	8	8
Or, omitting the extraordinary charge for buildings and fittings,				25	17	11

The following table, with regard to the state of the education of the persons imprisoned in 1866, shows the very intimate connection between ignorance and crime:

Degree of Instruction.	Proportion per Cent.	
	Males.	Females.
Neither read nor write,	33·3	37·2
Read, or read and write imperfectly,	62·2	60·6
Read and write well,	3·5	1·5
Superior instruction,	·2	·0
Instruction not ascertained,	·8	·7
Total,	100·	100·

Ireland.—In a previous part of this article we have dwelt very fully on the system of convict treatment in Ireland, and have shown the steady decrease in the number of that class of criminals in recent years. It will here, therefore, only be necessary to give statistics of other prisoners, and to state that in nearly everything relating to crime there is a marked difference in favour of Ireland as compared with England and Wales. This can be at once seen from the annexed table:—

Total Criminal Classes.	Ireland.	Number in a portion of the Population of England and Wales equal to that of Ireland.	Irish Criminal Classes less than those in equal Population in England and Wales.
Criminal classes at large,	22,290	34,021	11,831
In local prisons,	2,803	4,854	2,051
In the convict prisons,	1,768	2,167	399
In reformatories,	591	883	292
	27,452	41,995	14,543

The nature of the 4326 cases tried at the Sessions and Assizes in Ireland in 1866 were as follows:—

Offences.	Total Number of Offenders Committed.	Convictions and Sentences.					Insane, to be detained.	Acquitted or discharged. No Bills found, &c.
		Death.	Penal Servitude.		Imprisonment and all lighter Punishments.	Total Convictions.		
			For Life.	For Years.				
Offences against the person,	1468	4	2	20	777	803	16	649
Offences against property with violence,	211	—	—	34	73	107	—	104
Offences against property without violence,	1429	—	—	154	747	901	5	523
Malicious offences against property,	62	—	—	6	11	17	1	44
Forgery, and offences against the currency,	63	—	—	1	31	32	—	31
Other offences,	1093	—	1	33	524	558	4	531

The following is the actual state of crime in Ireland since 1853. The wonderful decrease shown in the last three columns is very marked. The exceptional increase in the years 1861–63 is accounted for by the great distress which prevailed at that time in various parts of the country:—

Years.	Number of Cases Tried.	Convicted.	Proportion of Convictions to Population.	Summary Convictions before Magistrates.	
				Petty Offences.	Drunkenness.
1853	15,144	8,714	1 in 758	43,186	12,404
1854	11,788	7,051	1 in 920	37,958	12,215
1855	9,012	5,220	1 in 1150	29,274	9,056
1856	7,099	4,024	1 in 1628	25,461	9,516
1857	7,210	3,925	1 in 1516	23,563	9,557
1858	6,308	3,350	1 in 1795	20,693	8,424
1859	5,565	3,109	1 in 1930	18,326	8,416
1860	5,386	2,979	1 in 2014	18,444	8,086
1861	5,586	3,271	1 in 1762	18,352	6,972
1862	6,666	3,796	1 in 1528	19,778	7,126
1863	6,078	3,285	1 in 1765	19,432	7,500
1864	5,080	3,000	1 in 1932	22,571	8,597
1865	4,657	2,661	1 in 2142	20,556	8,773
1866	4,326	2,418	1 in 2398	19,672	9,782

Within even the last twenty years many of the prisons in Ireland were in a very wretched condition, and although great improvements have since been effected and some of their best penal establishments are now of a very superior description, others, especially in the more remote parts of the country, are by no means equal to the gaols in England.

Scotland.—The prisons of Scotland were in a state of gross mismanagement when, in 1826, a committee of the House of Commons was appointed to inquire into the subject. The recommendations of that committee, the appointment of inspectors, and the passing of an Act of Parliament (2 & 3 Vict. c. 46), by which the burden of maintaining prisons was removed from the royal burghs, and provided for by a general rate upon property, and their management is devolved upon county boards, and upon a general board sitting in Edinburgh, have led to great improvements.

The following table exhibits the number of criminal offenders in Scotland on the average of each of the six quinquennial terms from 1836 to 1865, and in each year from 1863 to 1865; the numbers brought to trial, convicted, outlawed, or found insane, convicted under the aggravation of previous convictions, and sentenced to death and executed:—

Period.	Committed for Trial or Bailed.			Tried.	Total Convicted, Outlawed, or Found Insane.	Convicted under Aggravation of Previous Convictions.	Sentenced to Death.	Executed.
	Males.	Females.	Total.					
Average of 1836–40,	2516	834	3349	2789	2563	506	2⅜	1⅜
Average of 1841–45,	2685	1010	3696	3082	2791	641	1⅝	1
Average of 1845–50,	3248	1240	4488	3689	3370	977	2⅛	1⅛
Average of 1851–55,	2812	1069	3881	3190	2947	854	2⅛	1⅜
Average of 1856–60,	2552	1067	3619	2924	2524	831	1⅜	⅝
Average of 1861–65,	2387	931	3318	2708	2464	792	2⅛	1
Year 1863,	2481	923	3404	2729	2451	842	1	—
Year 1864,	2302	910	3212	2580	2379	857	2	2
Year 1865,	2270	847	3117	2567	2360	739	3	1
Year 1866,	2202	801	3003	2557	2309	720	2	2

The subjoined table shows the classes of offences and the number of offenders in each class at different periods

Offences.	Annual Average of 1836–1840.	Annual Average of 1841–1845.	Annual Average of 1846–1850.	Annual Average of 1851–1855.	Annual Average of 1856–1860.	Annual Average of 1859–1860.	Annual Average of 1861–1865.	Year 1865.	Year 1866.
Offences against the person,	751	835	1088	1014	1034	906	869	889	884
Offences against property with violence,	530	537	703	532	377	437	428	333	336
Offences against property without violence,	1676	1883	2182	1916	1827	1748	1671	1553	1443
Malicious offences against property,	47	64	73	62	63	60	52	58	62
Forgery, and offences against the currency,	120	137	146	109	85	79	72	74	50
Other offences,	266	239	295	247	232	233	226	210	228

TRANSPOSITION, the name given in Algebra to the process of removing a term from one side of an equation to another, changing its sign. Thus, if $a = b + c$, by transposition $a - c = b$. On this we have only to remark, that in this instance the rule is not much of an abbreviation. If we say, 'transpose c,' instead of 'take c from both sides,' so little is gained, that it may be doubted whether it would not be better to follow the continental writers in the use of the latter form of expression: a process which would have the advantage of being a perpetual appeal to reason instead of rule.

TRANSPOSITION, in Music, is a change from the original key to one higher or lower. This is generally performed at a moment's notice by the accompanyist. He must assign to all the notes, as regards their pitch, or their situations on his instrument, names wholly different from those in the copy placed before him. To accomplish this he has to suppose a change of clef, or clefs, and thus give new designations to all the lines and spaces. For instance—a pianoforte player is required to transpose an air a whole tone lower, from A to G. For this purpose he must assume a change in both clefs, the treble into the tenor, and each note to be played an octave higher than it is written; the base into the alto, and each note to be played an octave lower than it is written.

TRANSUBSTANTIATION. [SACRAMENTS.]

TRANSVERSAL, a name given to a line which is drawn across several others, so as to cut them all, as when a straight line intersects the three sides of a triangle.

TRANSVERSE, in Conic Sections, a name often given to one of the axes of a figure, usually that of greatest magnitude, or which goes most directly across the figure. Thus the longer axis of an ellipse or hyperbola is called the transverse axis. Properly speaking, it ought to be only a term of relative distinction: either axis is transverse to the other.

TRANSYLVANIA, a crown-land of the Austrian empire, lies between 45° 12′ and 47° 42′ N. lat., 22° 15′ and 26° 20′ E. long.; its greatest length from N.W. to S.E. is 194 miles, and its greatest breadth from W. to E. is 184 miles. It is bounded N. and W. by Hungary, E. by the Bukowina and Moldavia, and S. by Wallachia. The Germans call it *Siebenbürgen*, the Hungarians, *Erdely Orzag* ('woody country'). The Latin name Transylvania was given to it by the Hungarians from the circumstance that extensive woody mountains separate it from Hungary. The eastern and southern boundaries are formed by the Carpathian mountains, the passes of which are of great military importance, being the only means of communication between Transylvania on one side, and Moldavia and Wallachia on the other. Some of them are exceeding narrow, and are cut through the solid rock for more than 30 miles. Many of them have been the scene of most desperate conflicts with the Turks.

The surface of the country is very much diversified, but is generally mountainous: the Carpathian chain not only covering its S. and E. frontier, but sending out numerous ramifications, the most important of which proceed from E. to W. The culminating points of the mountains are situated near the south frontier, where Negoi, not far from Hermannstadt, has a height exceeding 8000 feet; and Butschetsch, near Cronstadt, is scarcely 100 feet lower. Many of the summits present scenery remarkable for its grandeur. Extensive tracts of the hilly and mountainous parts are covered with forests, which yield abundance of magnificent timber. There are no plains of importance, but the valleys are numerous and very picturesque. The lowest part of the country is more than 500 feet above the level of the sea.

All the important rivers are tributaries of the Danube, either flowing directly into that river, or joining the Theiss. The *Maros* rises on the eastern frontier at the foot of Mount Tatarrhago. It runs, with many windings and a general westerly course, past Karlsburg and Arad, and enters the Theiss opposite Szegedin. The whole length is about 400 miles, 190 of which are in Transylvania; it is navigable for boats at Karlsburg. The river contains abundance of fish. The *Szamos* is formed by the junction of the Great and Little Szamos. The former rises in the N.E. of Transylvania, and runs S.W. as far as Deez, where it is joined by the latter, which flows N.E. past Clausenburg from the western frontier. From Deez the united stream first runs N.W., then S.W., and at last N., till it reaches the northern boundary a little above Szada: it joins the Theiss at the village of Apata. The whole length of the Szamos is upwards of 200 miles, and three-fourths of its course are in Transylvania. The *Alt*, or *Aluta*, rises a little E. of the source of the Maros to the S. of Mount Tatarrhago; it runs at first from N. to S. in an Alpine valley bordered by high and steep rocks, till it reaches the limits of the district of Cronstadt. There it turns suddenly N.N.W., but soon again changes its direction to S.W. and W., as far as the southern environs of Hermannstadt, whence it flows S. as far as its junction with the Danube opposite Nikopoli. The length of the Alt is about 250 miles, 134 of which are in Transylvania. The Austrian government have succeeded in making it navigable in Transylvania; the Wallachian part of it is still in a state of primitive wildness. There are some important lakes in Transylvania; that of Hados is 15 miles long; St. Anna is 10 miles long and as many broad; Piritsch, in the Carpathians, is renowned for the gas which is exhaled from its surface, and which suffocates birds that fly over it; and the Holt-Maros is a lake formed by the Maros near Karlsburg.

The summer days are very hot, especially in the valleys and in the western and southern parts of the country, but the nights are cold, and in the winter the cold is almost insupportable. In the east the temperature is wet and cold, and not favourable for grain. Cold winds prevail in the spring and autumn, and blow with great regularity. Dreadful storms followed by sudden severe cold are frequent. On the whole, however, the climate is considered healthy, and is more equable than that of Hungary, the mountain chain along the southern frontier keeping off the hot winds.

In the valleys of the south and west the soil is of great fertility: the eastern and northern parts and a tract along the western frontier are covered with forests, where the soil is stony in many districts; but even the stony surface is covered with a layer of mould which renders it very suitable for the cultivation of the vine, and there can be no doubt that at some future time Transylvania will rank very high as a wine-producing country. All the gentlemen, and even the superior tradesmen, already make their own; and though the process of manufacture is very rude, several fine kinds are produced. In fact, a recent traveller considers some of them to be the very best wines in the world. The quantity made at present is about 16,000,000 gallons per annum. The most important mineral is rock-salt, a bed of which extends from Wallachia through Transylvania to Galicia,

covering a space of 570 miles in length, and from 60 to 80 miles in breadth. About 1,500,000 cwts. of salt are annually obtained from the mines; besides which there are 120 salt springs. The other mineral products are gold, silver, iron, lead, copper, antimony, arsenic, mercury, alum, sulphur, nitre, and marble. More than twenty gold mines are worked, and nearly every stream in the country is auriferous. Coal and peat abound, but they have not been used for fuel in consequence of the plentiful supply of wood. Various kinds of precious stones are found in the mountains and rivers. The mineral waters are celebrated. Besides enormous quantities of timber, Transylvania produces wheat, barley, corn, oats, millet, and maize; apples, pears, and other fruits in abundance; and good tobacco, especially in the valley of the Alt. Notwithstanding the backward state of its agriculture, more corn is generally produced than is required for home consumption. The breeding of cattle chiefly occupies the Wallachians residing in Transylvania; sheep are numerous, and large quantities of hogs are fed in the forests. Fish, wild and tame fowl, and game of all sorts abound; wolves are frequent in the Carpathians, and even bears and lynxes are occasionally met with. The horses are small, but swift, and very suitable for light cavalry. Buffaloes are used for field labour. Manufactures scarcely exist, except in the valley of the Alt, where the Germans produce some fine dyed cloths and cotton, felt hats, leather, and linen. The commerce with Wallachia, Moldavia, and Turkey, is of some importance; but the country suffers very much from its isolation, and from the want of good roads, and its trade is by no means proportionate to the extent and variety of its productions.

The whole area of Transylvania is 21,000 square miles, and the population at the last census was 1,926,797, of whom 1,104,322 were Wallachs and Eastern Roumains, 517,577 Magyars and Szeklers, 200,364 Germans, and the remainder Sclaves, Gipsies, Armenians, Jews, Italians, &c. No country in the world has, within so small a compass, so great a variety among its inhabitants, comprising fourteen distinct races. Arranged according to the religion they profess, there are about 625,000 non-united Greeks; 550,000 Greek Catholics and Armenians; 460,000 Protestants, chiefly Calvinists, Lutherans, and Unitarians; 230,000 Roman Catholics; and 14,000 Jews; leaving about 50,000 for other denominations. The different sects are supported by the state, and enjoy equal privileges.

The Diet of Transylvania consists of 165 members—125 elected by the people, and forty nominated by the crown. In the elections every man has a vote who has attained the age of twenty-four, and pays direct taxes to the amount of eight florins, or about 15*s.*; and all citizens of irreproachable character, and above thirty years of age, are capable of being elected. The sum raised in direct taxation now amounts to over 4,000,000 florins, or about 400,000*l.* per annum.

The Austrian government appears to be sincerely anxious to rule the country fairly, and develop its resources more fully, but the greatest possible difficulty exists, in consequence of the different nationalities of the inhabitants, and the feeling of jealousy they often entertain towards each other. The Wallachs, who have for centuries been kept almost in the position of serfs, are gradually obtaining more influence and importance; and the Saxon or German element, which was so long the dominant one, is declining. Were the laws more strictly and firmly administered, a better system of registering property for the purpose of easier transmission and sale introduced, and the country provided with roads and railways, it could not fail to attract capitalists from England and elsewhere, and ultimately to become one of the most prosperous in Europe.

Towns.—HERMANNSTADT (the capital, and place of meeting for the Transylvanian Parliament), CLAUSENBURG, and CRONSTADT (two of the principal towns), will be found described in their respective places. *Bistritz* ('Besztercz') is on the river Bistritz, 50 miles N.E. of Clausenburg, and has 5580 inhabitants, who manufacture cloth, leather, and soap, and trade in cattle. It is fortified, and has several churches, a gymnasium, grammar-schools, &c. The surrounding district is intersected by a branch of the Carpathian mountains, and the climate is severe. *Karlsburg* (Hungarian, 'Karoly-Fejervar'), on the Maros, 48 miles S. of Clausenburg, is the seat of the Roman Catholic bishop of Transylvania. The city is strongly fortified, and in its environs are rich gold mines. The population is 5240, comprising many Jews, who enjoy peculiar rights here. The principal public buildings are—the Roman Catholic cathedral; the Bathany church; the palace of the bishops of Transylvania; a Roman Catholic gymnasium, with the provincial archives; a mint, observatory, and arsenal; barracks, hospitals, and several public libraries. *Nagy-Enyed*, 17 miles further up the Maros, has 6000 inhabitants, a Protestant college, a museum, public library, cavalry barracks, &c. *Neumarkt* ('Maros-Vazarhely') 77 miles N.W. of Cronstadt, is also on the Maros, and contains a strong castle, a Roman Catholic gymnasium, a Protestant college, with a cabinet of natural history; a mineralogical museum, and a public library. Its population is about 3000. *Schässburg* ('Segesvar'), on the Great Kükel, in a beautiful valley, 24 miles E.S.E. of Neumarkt, is fortified, and divided into an upper and lower town. It has a gymnasium, and 7000 inhabitants, mostly Saxons, who manufacture cotton and cloth, and carry on an active trade in wine in the neighbourhood. This town has a very ancient appearance. *Thorenburg* is a market town 17 miles S.E. of Clausenburg, with a population of 8000. Near it are rich mines of rock-salt; and the ruins of the Roman fortress *Salinæ*, a station of the seventh legion, who have left various inscriptions there. *Varhely* ('Gradistje'), in the valley of the Hatzeg, is on the site of the ancient capital of Dacia, which was afterwards occupied by the Romans, and named by them *Ulpia Trajana*. The environs are full of Roman antiquities.

A narrow tract of Transylvania along the frontier of Moldavia and Wallachia belongs to the Austrian Military Frontier, and has a separate administration with regard to military affairs. [MILITARY FRONTIER.]

An excellent and very interesting work on the country, to which we refer the reader for further information, is *Transylvania: its Products and its People*, by Charles Boner, London, 1865.

TRAPA, a genus of plants of the natural family of *Onagrariæ*, but sometimes appended to the *Haloragæ*, sometimes formed into a distinct order *Hydrocaryes*, Water-nuts. The fruit is furnished with spines, and the species are commonly called Water-caltrops, from the plants floating on the surface of lakes, and on that of slow-running streams. They are found in the temperate parts of Europe and of Siberia, in Cashmere, India, Cochin-China, and China.

These small plants are of much more importance than many which are more conspicuous or better known, from the fact that their large seeds consist of pure edible

fecula. *Trapa natans*, the European species, is remarkable for its fruit with four spines, being of a blackish colour and large size, and its seed, which nearly fills it, being farinaceous, and good to eat, whether raw, roasted, or in soups. It is somewhat like a chestnut in taste. It was known to the Romans by the name of *Tribulus*.

The Indian and Chinese species have each only two spines. The former is the *Trapa bispinosa*. In India the nuts are sold in all the bazaars, as their farinaceous kernels are much esteemed by the Hindus. A species called in Hindustan *Singara* forms a considerable portion of the food of the inhabitants of Cashmere, where it bears the same name. The Chinese *Trapa bicornis* is carefully cultivated in lakes, ponds, and other receptacles of water.

TRAPANI, a province comprising the western extremity of the island of Sicily, the area of which is 1058 square miles, and the population in 1862 was 214,981. Its general features and principal towns, except the capital TRAPANI, are described under SICILY.

TRA'PANI, a town on the N.W. coast of Sicily, 46 miles W. of Palermo, is built on the site of the ancient Drépanum, on a point of land projecting into the sea, and facing the island of Levanzo, which is 10 miles W. of it. Drépanum was a place of traffic from the oldest times on record; there are, however, no remains of antiquity now extant. The harbour, which is accessible to vessels of about 300 tons burthen, is formed by an inlet of the sea between the promontory and the mainland, and protected on the west by an isolated rock, surmounted by an ancient fort, but it is open to the libeccio, or south-west wind, which is most dangerous on this coast. Trapani is one of the principal ports of Sicily; it carries on a considerable trade in salt, made by evaporation from sea-water, tunny fish, coral fished up along the coast of Barbary and worked in the town, anchovies, sulphur, sumach, wine, gems, and alabaster. The seamen of the port are among the best in the island. The town contains a collegiate church, numerous other churches (some of which contain fine paintings), many convents, several palaces built in a quaint mediæval style, a theatre, a handsome town-hall, a royal college, an orphan asylum, hospitals, and a population of 30,592. It is inclosed by walls, and is defended by a fortress. The streets are wide and well paved with flag-stones. Drépanum was the scene of a celebrated naval battle between the Carthaginians and the Romans (B.C. 237), when the latter were signally and completely defeated.

TRAPESUS. [TREBIZOND.]

TRAPEZIUM (from the Greek τραπεζιον, 'a little table') is the general term for a four-sided plane figure, and is synonymous with *quadrilateral*. Four-sided figures, however, which have parallel sides possess distinctive appellations, and the term trapezium is generally restricted to quadrilaterals whose sides are not parallel.

TRAPEZOID, a plane quadrilateral which has two of its sides parallel.

TRAPPISTS, THE, a religious order, remarkable for the austerity of its practices, was founded where it still lingers out a decaying existence, at La Trappe in Normandy, about the middle of the twelfth century. The abbey belonged to the Cistercian monks, but having fallen into much laxity of discipline was remodelled on a rigid system by a certain count de Perche. In the course of years, however, this rigidity almost disappeared, and there was assuredly little of it remaining when the abbey, about 1662, was conferred upon the celebrated Armand Jean le Bouthelier de Rancé; a man of courage, wit, ability, and unbridled profligacy, who was suddenly converted to a Christian life by the death, under appalling circumstances, of a favourite mistress. He set himself to work, with all the energy of his character, to reform La Trappe, and instituted a disciplinary system therein of the severest character. Over every obstacle thrown in his way by the monks themselves or by others his strong will triumphed, and he proved his sincerity by entering anew as a novice in 1663. In the following year he solemnly took the usual vows, and was re-installed as abbot. Thenceforward he ruled with a despotic crozier. He forbade his monks the use of meat, wine, eggs, fish; enjoined upon them perpetual silence except in cases of necessity; revived the old monastic custom of manual labour, and completely cut them off from all intercourse with the outer world. The day began at two A.M. with matins in the church, lasting till half-past three; then followed a brief period of private devotion; after which at five, the office of prime, and a lecture. At seven each monk addressed himself to his allotted secular task, returning to the choir at nine for the successive offices of terce, sext, and nine; dining at their close upon a simple dish of vegetables dressed in oil or butter, with a little fruit. Manual labour again occupied a couple of hours, and the monks next devoted an hour to private prayer or reading, each in his own bare solitary cell. At four P.M. vespers were performed in the choir. A brief pause of repose, a supper of bread and water, a lecture, complins in the choir at six, and half an hour of private meditation brought the day to a close at eight o'clock. Then the Trappist betook himself to his hard straw mattress, and sought what sleep he could; sleep being often denied, we fear, to a body insufficiently nourished and a mind constantly overwrought.

During the life of De Rancé the Trappists flourished, and he himself was worshipped by the superstitious, while the sagacious man of the world could not withhold from him his respect. At the Revolution the brotherhood was dispersed, but many of its members found an asylum and a resting-place at Valsanite, in the Swiss canton of Freiburg. Thence they were driven by the storms of war to Augsburg, to Munich, and finally to Lithuania, while small communities were planted in England, Italy, Spain, and other countries. In 1816 they re-purchased their old monastery, where they now number about 200 members, and they have formed several small colonies in France, Germany, Ireland, and North America. Their influence now, however, is inconsiderable. They may occasionally attract some great offenders by the promise of self-punishment which their system holds forth as a compensation for past errors; but the world at large has not failed to perceive that both their theory and their practice are anomalies in an age of progress, and antagonistic to the true interests of society.

TRAS-OS-MONTES, a province of Portugal, bounded N. and E. by Spain, S. by the province of Beira, and W. by that of Minho, lies between 41° 4′ and 41° 57′ N. lat., 6° 10′ and 8° W. long.; it is 80 miles long from E. to W., and 55 from N. to S.; the area is 4000 square miles; and the population in 1863 was 385,896. The surface is hilly and dry, with the exception of the river valleys, which are highly cultivated, and produce abundance of wheat, maize, rye, beans, and all kinds of fruits. In places sheltered from the north wind the olive and mulberry are extensively planted, and much oil and silk produced. On the banks of the rivers, and especially along the right bank of the Douro, which forms the boundary on the E. and S., the vine—from which port wine of superior quality is made—is the great object of cultivation. Cattle, horses, sheep, and pigs are

numerous—the last being fattened on chestnuts. The mountains contain valuable minerals, but very few mines are worked; and some silk and linen are the only manufactures. Wine is the chief export. The province is drained by the Douro, and its feeders the Sabor, Tua, Corgo, and Tameja, and is divided into two districts, Villareal and Bragança, named from its two chief towns. *Villareal* is situated on the Corgo, 60 miles S.W. from Bragança, and has about 4500 inhabitants, who carry on a brisk trade in the products of the district. *Bragança*, the capital of the province, and the original seat of the royal house of Portugal, stands in a fertile plain on the Fervenza, a feeder of the Sabor, and has 5000 inhabitants, who manufacture taffeta, velvet, and other silk fabrics. The city, which is partially fortified and defended by a citadel, is the residence of the bishop of Bragança and Miranda, and has two churches and a college. *Regoa*, a small village on the right bank of the Douro, in the south-west of the province, deserves notice for its large port-wine fairs and stores. The other towns are *Torre de Moncorvo* and *Miranda*.

TRAVANCORE, a state at the S. extremity of India, tributary to the British, having W. and S. the Indian Ocean, and landward the Madras districts, Malabar, Coimbatoor, Madura, and Tinnevelly. Area, 4722 square miles. Population, 1,011,824. Surface mountainous in the E.; elsewhere varied with hill and dale, but only about two-thirds are capable of cultivation. The products comprise rice, almonds, cardamoms, pepper and other spices, betel and cocoa-nuts, tobacco, ivory, and bees-wax. Elephants, large tigers, and buffaloes inhabit the more remote parts. Property of all kinds, as in Canara, descends in the female line. The inhabitants are mostly Hindus, but there are estimated to be 100,000 Syrian Christians, and in some communes Christian churches are much more numerous than pagodas and mosques. Principal towns, *Trivandrum* (the capital), *Anjenga*, and *Quillon*. *Travancore*, the old capital of the state, 50 miles N.N.W. of Cape Comorin, is now in decay.

TRAVEMÜNDE. [LUBECK.]

TRAVERS, JOHN, was educated first in St. George's Chapel, Windsor, and afterwards under the celebrated Dr. Greene. In 1737 he was appointed organist to the Chapels Royal. He died in 1758. Travers was the author of the highly popular glees, 'Haste, my Nanette;' 'I, my dear, was born to-day;' 'When Bibo thought fit;' 'Soft Cupid,' and of some cathedral music.

TRAVERSE, in Law, is a contradiction of some matter of fact alleged in pleading by the opposite party. It ought to be by express words, and not argumentatively. Generally all matter of fact that is material ought to be either confessed and avoided, or traversed; and if a party justifies an act as to one particular time and place, or confesses and avoids in one respect, he ought to traverse it as to all other. Otherwise what is materially alleged will be taken to be admitted.

In criminal pleading, traverse of an indictment is the taking issue and denying some material point in it. Not guilty is a general traverse, which throws on the prosecutor the necessity of proving all the material facts.

The term Traverse is unknown in Scotch law. In criminal prosecutions the defence is 'not guilty;' in civil cases, a denial of the relevancy, or of the facts alleged by the pursuer.

TRAVERSE TABLE. In Navigation two tables bear this name; the one is a list of courses, distances, northings, southings, eastings, and westings, in which they are arranged for the convenience of addition, so that differences of latitude and departure may be readily deduced in dead reckoning, when a ship cannot lay her course, but sails in various directions, or upon a traverse, as it is called. That which is more properly called a Traverse Table is one from which the various northings, southings, &c., as above, are gathered.

TRAVERSES, in Fortification, are usually masses of earth which are raised at intervals across the terreplein of a rampart or the covered-way of a fortress. On a rampart they serve to protect the guns and men against the effects of a ricocheting or enfilading fire, which might otherwise dismount the former, and compel the latter to abandon the parapet: and in the covered-way, besides serving for similar purposes, they constitute retrenchments behind which the defenders may keep up an annoying fire of musketry upon the enemy, should the latter attempt to force his way along the branches of that work. On this account they are provided with banquettes, or steps, on which the defenders may stand to fire over them. Palisades are planted along the banquettes, in order to prevent the assailants from suddenly passing over the traverses; and at the passage between each traverse and the interior side of the glacis is a strong gate or barrier, which is closed in the event of the defenders being obliged to retire from one traverse to the next, or to abandon the covered-way entirely.

TRAVERTIN, the Italian term for concretionary limestone produced from springs holding carbonate of lime in solution. A large proportion of the most splendid edifices of ancient and modern Rome are built of travertin derived from the quarries of Ponte Leucano.

TREACLE. [MOLASSES.]

TREAD MILL, an instrument of prison discipline, invented by Sir William Cubit, of Ipswich, which was formerly much used in the prisons of Great Britain, but which, owing to its excessive severity, and the impossibility of modifying it to suit the physical strength of individuals, has been recently abandoned, and an appliance called the *Crank* substituted. The tread mill consisted of a long cylinder, about 5 feet in diameter, whose circumference was planted with twenty-four equidistant steps. It revolved on its axis through the force supplied by the tread of prisoners, who were each shut up in a separate boarded compartment, and provided with a hand-rail to assist his movements. It revolved about twice in a minute, equivalent to a vertical ascent of 32 feet. The *crank* is a small wheel with flanges, like the paddle-wheel of a steam-vessel, which the prisoner, by turning an external handle, causes to turn round within a case filled or partly filled with gravel. A register outside the prisoner's cell records the number of revolutions made, and the task is rendered more or less arduous by the quantity of gravel in which the wheel revolves.

TREASON is derived from the French *trahison;* and in conformity with this derivation, the offences designated by it in English law always contained the notion of treachery, or a breach of that allegiance supposed to be due from an inferior to a superior. Thus petit treason was the murder of a husband by his wife, or a master by his servant, or a bishop by his subordinate in the church; and high treason consists in an attack upon the king as the political head of the state. The former of these two kinds of treason was abolished by 9 Geo. IV. c. 31, s. 2, which enacts that every offence which before that Act would have amounted to petit treason, should be deemed to be murder only, and no greater offence. The only treason, therefore, which can now exist is high treason.

Originally the notion of high treason was very vague. The first intelligible definition of it was given by the Statute of Treasons (25 Edw. III. st. 5, c. 2), which is still the chief law on the subject. The following acts are treasons according to this statute:—Compassing the death of a king (which term includes a queen regnant), or of his queen, or their eldest son and heir; violating the king's companion (that is, his wife), during the marriage, or the king's eldest daughter unmarried; or the wife of the king's eldest son and heir; levying war against the king in his realm, and being adherent to the king's enemies in his realm, giving them aid and comfort in the realm or elsewhere, and being thereof attainted of open deed; or slaying the chancellor, treasurer, or the king's justices of the one bench or the other; justices in eyre or justices of assize, or any other justices assigned to hear and determine in their places during their offices. The words of this statute, 'compassing and imagining,' were by the interpretation of the courts made to comprehend cases to which the words do not directly apply, and this was called 'constructive treason.'

The doctrine of constructive treason having been brought into prominent notice and much discussed in the trials of Hardy, Horne Tooke, and others, in 1794, the statute 36 Geo. III. c. 7, was passed with a view of superseding the necessity of resorting to any such modes of interpretation for the future. This statute, which, although originally in force only for the life of Geo. III., was made perpetual by the statute 57 Geo. III. c. 6, enacted that 'if any person shall, within the realm or without, compass, imagine, invent, devise, or intend death or destruction, or any bodily harm tending to death or destruction, maim or wounding, imprisonment, or restraint of the person of the king, or to deprive or depose him from the style, honour, or kingly name of the imperial crown of this realm, or of any other of his Majesty's dominions or countries, or to levy war against his Majesty within this realm, in order by force or constraint to compel him to change his measures or councils, or in order to put any force or constraint upon, or to intimidate or overawe both Houses or either House of Parliament, or to move or stir any foreigner or stranger with force to invade this realm, or any other of his Majesty's dominions or countries under the obeisance of his Majesty; and such compassings, imaginations, inventions, devices, and intentions, or any of them, shall express, utter, or declare, by publishing and printing or writing, or by any overt act or deed, every such offender, being legally convicted upon the oath of two lawful and credible witnesses, shall be adjudged a traitor, and suffer, as in cases of high treason.' It was no doubt the intention of the legislature that this statute should put an end to all artificial constructions of the statute of Edward III.; nevertheless the practice of resorting to these forced interpretations has been continued, and sanctioned by the judges in several subsequent prosecutions for high treason. ('Sixth Report of the Commissioners on Criminal Law,' p. 16.)

However, by the 11 & 12 Vict. c. 12, entitled 'An Act for the better security of the Crown and Government of the United Kingdom,' it was enacted (repealing that part of 57 Geo. III. c. 6), the person so offending should be guilty of felony, and on conviction should be liable, at the discretion of the court, to be transported beyond the seas for life, or for any term not less than seven years, or to be imprisoned for any term not exceeding two years, with or without hard labour, as the court should direct; provided always, that if the facts alleged in the indictment or proved on the trial of any person charged with felony under that Act, should amount in law to treason, such indictments should nevertheless not be deemed void, erroneous, or defective, nor should such person be entitled to be acquitted of such felony; but no person tried for the felony should afterwards be prosecuted for treason upon the same facts.

It was provided, however, by the fourth section of this statute that no person should be prosecuted for any felony by virtue thereof in respect of any compassings, imaginations, inventions, devices, or intentions, in so far as the same are expressed, uttered, or declared, by open and advised speaking only, unless information thereof, and of the words by which the same were expressed, uttered, or declared, be given on oath to one or more justice or justices of the peace, within six days after they have been spoken, and unless a warrant for the apprehension of the person by whom they have been spoken be issued within ten days after such information should have been given as aforesaid, and unless such warrant should be issued within two years next after the passing of the Act; and that no person should be convicted thereof except upon his own confession in open court, or unless the words so spoken should be proved by two credible witnesses.

The clause in the Statute of Treasons which declares the offence of counterfeiting the king's coin to be high treason was repealed by the statute 2 Will. IV. c. 34; and the crime itself has been, by the 24 & 25 Vict. c. 99, divided into distinct classes of felonies and misdemeanors, with a graduated scale of punishments.

The following are also high treasons:—Endeavouring to prevent the person next in succession to the crown, according to the Acts of Settlement, from succeeding thereto (1 Anne, st. 2, c. 17, s. 3). Affirming by writing or printing that any other person has a right to the crown otherwise than according to the Acts of Settlement and the Acts for the Union of England and Scotland, or that the crown, with the authority of Parliament, is unable to limit the descent of the crown (6 Anne, c. 7, s. 1). Being married to, or being concerned in procuring the marriage of any issue of her present Majesty, whilst such issue are under eighteen (in case the crown shall have descended to any such before that age), without the consent in writing of the regent, and the assent of both Houses of Parliament (3 & 4 Vict. c. 52, s. 4). Knowing any person to have committed any of the before-mentioned treasons, receiving, relieving, comforting, or assisting or aiding his escape from custody.

The forfeitures consequent upon conviction for high treason, and the judgment pronounced by the court, are stated in the article Law, Criminal.

By the Treaty of Union (1707) the treason law of England was extended to Scotland in all points, even in the forms of procedure.

TREASURE-TROVE, in legal Latin called *thesaurus inventus*, is a branch of the revenue of the crown of England, and belongs to the king or his grantees. If coin, plate, or precious metals are found hidden in the earth or any private place, and the owner or person who deposited them is unknown, the property belongs to the king. But if the owner is known, or is ascertained after the treasure is found, the property belongs to him. By a constitution of Hadrian ('Inst.' i., tit. i. s. 39), if a man found treasure (*thesauri*) in his own ground it belonged to the finder, and also if he found it in a place which was sacer (sacred to the gods above), or religious (sacred to the Dii Manes). If a man found treasure accidentally in another man's ground, the constitution gave half to the finder, and half to the owner of the ground. If he

found treasure in the ground of the emperor, the finder had half, and the emperor half; and the law was the same if the ground belonged to the fiscus, or to the Roman people, or to any civic community. The law of England adopts the Roman definition of treasure-trove of Paulus ('Dig.' 41, tit. i. s. 31). 'Treasure (thesaurus) is an ancient deposit of money, of which there is no record so as to give it an owner: for thus it becomes his who has found it, because it does not belong to another;' and to entitle the crown to the property, it must appear to have been hidden or deposited by some one who at the time had the intention of reclaiming it. Whenever therefore the intention to abandon appears from the circumstances —as, for instance, where the property has been found in the sea, or in a pond or river, or even openly placed upon the surface of the earth—it belongs to the finder. In England the concealment of treasure-trove from the king was apparently formerly a capital offence; at present it is a misdemeanor punishable by fine and imprisonment.

The same law prevails in Scotland, but by an order in exchequer, 20th January, 1859, an offer of reward is made, equal in amount to the *intrinsic* value of the articles, on the same being delivered up to sheriffs for behoof of the crown.

TREASURY, a department of the British government which controls the management, collection, and expenditure of the public revenue. The function of payment has, ever since the Restoration, been completely separated from the custody of the public revenue, the former only being vested in the Treasury, while the latter belongs to the Exchequer; and it is the business of this department to take care that no issues of public money are made by the Treasury without their being in conformity with the authority specially enacted by Parliament. When money is to be paid on account of the public service, this is almost always done on the authority of a Treasury warrant; and in other cases the countersign of the Treasury is requisite. The Treasury Board consists of the prime minister, the chancellor of the Exchequer, and three junior lords, who usually have seats in Parliament, as have also the two joint secretaries of the Treasury. Previous to the reign of George I. the head of the Treasury was called lord high treasurer, but since that time his office and functions have been executed by the lords commissioners. The prime minister has the title of First Lord of the Treasury, but being the head of the administration, his duties are not limited to that department, the business of which is chiefly conducted by other members of the board. The really effective head of the Treasury is the chancellor of the Exchequer, who also holds a distinct office as under-treasurer, and has a responsible control over the various branches of the service, and over all works involving annual outlay in the naval, military, and civil departments, either at home or in the colonial possessions. He prepares every year an estimate of the national expenses, and proposes the ways and means by which they are to be met; and submits this statement, known as the Budget, to the House of Commons. Occasionally, the prime minister, when a member of the House of Commons, has held at the same time the office of chancellor of the Exchequer. The really onerous duties of the board fall upon the secretaries, those performed by the junior lords being to a great extent formal.

All supplies for the various departments are issued under the authority of the Treasury. The duties of the board comprise the examination of the expenses of legal establishments, sheriffs, county courts, and criminal prosecutions. The Boards of Customs, of Excise, of Stamps and Taxes, and the Post-office, are all subordinate to its authority, and the various officers in these departments are to a great extent appointed by the lords of the Treasury, who may be appealed to in all cases against decisions connected with the receipt of revenue.

The offices of the Treasury are in Whitehall. The amount paid in salaries of 1000*l.* and upwards, is about 30,000*l.* a year. The first lord receives 5000*l.* a year; two secretaries 2500*l.* each, and the assistant-secretary 2000*l.*; the solicitor is paid 2850*l.* a year; four commissioners 1200*l.*; and other officers receive sums varying from 1000*l.* to 1500*l.* each.

TREATY (from the French *traité*) means literally that which has been drawn up, or, in other words, arranged and agreed upon, by two or more parties, who are accordingly called the contracting parties.

Treaties relating particularly to individuals, such as the guaranteeing of the throne to a sovereign and his family, are known as *personal* treaties; while *real* treaties are those for national objects, independent of any change in the sovereignty, and these can only be made by sovereign powers, or by parties upon whom the sovereign power has conferred that right. In our constitution, for example, where the sovereign power consists of the king and the Parliament, the power of concluding treaties with foreign states generally belongs to the king, and is exercised by his ministers or those to whom he delegates the power. Should such ministers, however, conclude or advise treaties which shall be judged derogatory to the honour or disadvantageous to the welfare of the nation, they are liable to impeachment, a proceeding for which there are several precedents—chief among them being that of De la Pole, earl of Suffolk, in 1451, for making a convention of peace without the consent of the privy council; of Wolsey, in 1529, by the House of Lords, for making treaties without the king's knowledge; and of the earl of Oxford, by the Commons, in 1701, for advising treaties for dividing the dominions of Spain. In the United States of America the power is exercised by the president, with the advice and consent of the senate. No special form of words is necessary to insure the validity of a treaty, but it is usual to commit verbal agreements to writing as soon as possible. In warfare the power of limiting hostilities by truces, capitulations, or of making cartels for the exchange of prisoners, is recognized as incidental to the positions of generals, admirals, &c., these not requiring the ratification of the supreme authority, unless there be a reservation to that effect. Public ministers or other diplomatic agents are not entitled to conclude or sign treaties with foreign powers to which they are accredited, without a full authority, besides the general letter of credence. Even in the case of a treaty concluded with full powers, it is often in important cases considered expedient to have a special ratification by the sovereigns, or other proper authority of the contracting states.

Treaties between nations for mutual commercial advantages have often been made, the best known of late years being that between England and France, in the negotiation of which Richard Cobden took a very prominent part, and which has been productive of the greatest benefit to both countries. This, however, is rather the exception. Such treaties, as a rule, are cumbrous expedients for effecting what may generally be done better by the nation which has most to give and is able to take most, relaxing its own restrictive laws. These engagements, too, are for the most part only to be depended upon so long as they are for the advantage

of the one party as well as of the other. Hence the best and most durable treaty is always that which is the fairest and most equal. But the main purpose and utility of a treaty, after all, is not that it may secure certain advantages to either party, but that it makes clear and fixes those relations between the two which would otherwise remain obscure, indeterminate, and subject to continual misconception or controversy.

A Treaty of Guaranty is an engagement by which one state promises to aid another when it is disturbed, or threatened to be disturbed, in the peaceful enjoyment of its rights by a third power. The latest instance of the kind is that of Luxemburg, 1867, by which the principal European powers guarantee the neutrality of that territory in case of war.

Treaties of offensive alliance engage the ally to co-operate in hostilities against a specified power or against any power with which the other may be at war; or if defensive, the engagements of the ally extend only to a war of aggression commenced against the other contracting power.

There are several voluminous collections of treaties, of which one of the most complete is that of G. F. von Martens, who continued the works of Dumont and Rousset, the first volume of which was published in 1790. A preliminary account of all preceding printed collections was published by him in 1802. Successive supplements, by different editors, have brought down the account of the various treaties to a very recent period.

TREBBIA. [HANNIBAL; PO.]

TREBIZOND, *Trapesus*, an ancient town, situated on the Black Sea, in the eastern corner of Asia Minor. It was a colony of Sinope, a town founded by the Milesians. Xenophon with his 10,000 Greeks came to it in his retreat ('Anabasis.' iv. 8), and remained there thirty days. In the war with Mithridates the Romans took Trebizond, which henceforth belonged to their empire, and became a large and opulent city. Hadrian ordered the port to be secured by a mole. During the reign of Valerian (253–259) the town was taken and partly destroyed by Scythian barbarians, and fell into great decay till the reign of Justinian, who ordered the public buildings to be restored. It afterwards became the capital of a province which contained the ancient country of Pontus. In the middle ages the Genoese constructed a mole in the port of Trebizond, which is now almost entirely destroyed. At present the city, which is built on the slope of a hill declining to the sea, and backed by steep eminences rising behind, is the capital of the Turkish eyalet of Trebizond, the seat of the pasha of the province and of a Greek archbishop, and has a population of from 20,000 to 30,000, consisting of Mohammedans, Armenians, Greeks, and Christians. The Christians live chiefly in suburbs outside the town, where also the chief bazaars and khans have been established. Extensive gardens are contained within the walls, and outside are deep ravines filled also with gardens and crossed by long bridges. Among the public buildings the most remarkable are—the castle or citadel, partly of ancient and partly of modern construction, situated in the middle of the city on a steep rock, the summit of which is as flat as a table (τράπεζα, thence the name of the town); the bazaar; public bath-houses of marble; and the ruins of a temple of Apollo, part of which has been converted into a Greek chapel. There are altogether eighteen mosques, the principal of which, St. Sophia, was formerly a Christian church. The town has copper foundries, dye-works, &c. Its geographical situation renders it admirably adapted for commerce, and its trade has much increased since the navigation of the Black Sea was opened to all nations, and especially since the establishment of steamers, by which it has a direct and regular communication with Constantinople, Odessa, and the Danube, and is thus made the great entrepôt of the commerce between eastern Europe and central Asia. It has, in fact, become the second city in commercial importance in the Turkish empire. The imports and exports are now valued at nearly 4,000,000*l.* per annum each, and the number of ships which enter and clear from the port every year is about 700, of 30,000 tons burthen. The chief imports are cotton manufactures, hardware and fire-arms, cutlery, tin, grain, and colonial goods: the exports, which are mostly brought in caravans from Erzeroum, Tabriz, and Syria, consist of copper, carpets, and shawls, silk, gall-nuts, camel skins, wool, tobacco, wax, oil, opium, and drugs. The harbour is safe during the summer, but after the autumnal equinox and during the winter, most vessels resort to Platena, an open roadstead, about 7 miles to the W. There is a lighthouse, 105 feet high, on a battery at Kalmuk Point, in 40° 1′ N. lat., 39° 45′ E. long. The appearance of Trebizond from the sea is very fine, but the city itself does not realize the anticipations then formed of it, as the houses are generally mean and of only one story, although there are some of a superior description. The climate is genial, and figs, olives, pomegranates, and lemons are abundant. The atmosphere is very transparent, but so exceedingly moist that metals contract rust if only exposed to the air for a few hours.

TREBLE (Fr. *triple*), in Music, the highest part in a concerted piece. In vocal music, it is sung by boys or women. The treble is divided into first or highest, and second or low treble.

TRECATE. [NOVARA.]

TRECKSCHUYT (Dutch, 'track boat'), a covered boat, drawn by horses or cattle, and used for the transit of goods and passengers on the canals of Holland and Belgium.

TREDEGAR. [MONMOUTH.]

TREE, COTTON. Two very distinct plants are confounded under this name. One is a true Cotton-plant, the *Gossypium arboreum* of botanists, and the *Nurma* of the natives of India. The other is a species of *Bombyx*, or rather several species, so called from the capsules containing within them a silk-like substance, which has some resemblance to cotton, but none of the useful properties of cotton for spinning. It is therefore only used for stuffing beds and pillows.

TREE-CREEPER. [CREEPER.]

TREENAILS, or TRENAILS, are long cylindrical wooden pins, employed to fasten the planks of a ship's side and bottom to the corresponding timbers. The same name is also given to cylindrical wooden pins used by riggers for levers and heavers. In railway engineering treenails are wooden pins about 6 inches long and 1½ inch diameter, inserted into the holes of the stone blocks or sleepers to fasten the chair to.

TREES. The vegetable kingdom is frequently distributed into herbs, shrubs, and trees; and such a division constituted the basis of its classification by many of the older botanists. Herbs are plants whose stems live only for a single year. Shrubs have perennial stems, but no trunk. Trees are distinguished by possessing a trunk of varying size, from which spring a number of branches having a structure similar to it. The classification that would place trees all together is not a natural one, as it is making size a criterion of resemblance. In the most recent systems, as those of

Jussieu, De Candolle, and others, trees are found in all the principal classes. Thus amongst Exogens there are numerous examples, as the oak, elm, lime, &c.; amongst Endogens the palms; and even amongst Acrogens the tree-ferns. In the orders, trees, shrubs, and herbs frequently occur together, and even in some genera. Instances also occur of particular species being herbs in one country and shrubs in another, as the common mignionette. The division therefore of plants into trees, shrubs, and herbs, though convenient for practical purposes, and sanctioned by long usage, is not founded upon any essential difference in the character of the plants.

For practical purposes trees are divided into several kinds. Standard trees, or standards, are those which are allowed to grow naturally to a great height without topping. Dwarf trees are those which are not allowed to have more than one or two feet of trunk, being kept thus low by taking off the primary bud and allowing the collateral buds to develop. Forest trees are those which are grown in large quantities for the purpose of affording timber. They have tall straight trunks and scanty foliage, and embrace all the large trees, as the oak, the beech, the elm, the pine, &c., that naturally grow together in masses. Fruit trees bear edible fruits of various kinds, and are cultivated in orchards and gardens, such as the apple, pear, plum, cherry, &c. Wall-trees are those whose branches are extended against walls. They are mostly fruit-bearing trees, as the peach, plum, apple, &c.; sometimes, however, for the sake of protection and ornament, trees whose fruit is valueless are planted against a wall.

From the earliest periods of antiquity, trees, as the most majestic forms of vegetable creation, have constituted the wild grandeur of the forest, or the picturesque adornments of the landscape. Each portion of the earth, says Humboldt, has its peculiar beauty. 'To the tropics belong diversity and gradation in the forms of plants. As in the Musaceæ we have the widest expansion of leaf, in the Casuarinæ and the pencil-tree we have the greatest contraction of the leaf-vessels. Firs, thujæ, and cypresses characterise a northern clime, which is very uncommon in the plains of the tropics. Their ever-verdant green enlivens the dreary winter landscape, and proclaims to the inhabitants of the north, that even when snow and ice have covered the ground, the inner life of vegetation, like a concealed fire, is never extinguished on our planet.'

At an remote an epoch in the whole history as the Carboniferous period 'great oak' trees make the glory and beauty of the landscape, and the earth was covered with luxuriant forests, in which gigantic but mighty monsters now known to us only by their fossil remains. The characteristic feature of these forests was their immense tree ferns, of a size and magnificence which it is almost impossible now to form any idea of, but cone-bearing trees also flourished. The most remarkable coal-plants were Lepidodendra, Sigillariæ, Calamites, and Stigmariæ. The number of fossil species and variety may be gathered from the fact that in more than 244 species have been found in the coal-bearing rocks of Great Britain alone.

In all ages trees have been the subject of the poet and a favourite theme for the display of the researches of the naturalist. In the earliest time the dragons, woods, and groves, as sung by the poets, were resorted to as temples, and particular trees were considered to be the residence of certain deities. Thus in the Vedas and the Zendavesta and Shahnameh they presented to be mentioned, and the [illegible] taken particular species of trees under their protection. The mighty Zeus, or Jupiter, adopted the oak as the emblem of strength: Hercules, the poplar; Apollo, the laurel; Venus, the myrtle; Minerva, the olive; Bacchus, the ivy and the vine; and Cybele, the pine tree. The Greek historians have handed down to us many glowing accounts of the sylvan beauties of the eastern climes. Diodorus relates that Semiramis, the great Eastern queen, caused her grounds and spacious gardens, at the foot of Mount Bagistanus, to be laid out with all the finest trees that Asia could produce; while the parks of the Persian monarchs were adorned with cypresses whose obelisk-like forms resembled flames of fire; and, on that account, after the appearance of Zoroaster, they were planted around the sacred precincts of the Temple of Fire. Pausanias also mentions with admiration the grove round the Temple of Apollo at Gryneium Æolis; and in the celebrated shade of Sophocles the grove of Colonus is commemorated.

The magnitude and longevity of trees have ever been subjects of great interest to the naturalist, and more especially to the physiological botanist.

Under the article CALIFORNIA will be found some further particulars of the mammoth trees of the Sierra Nevada, whose antiquity and size surpass all the vegetable productions of the known world. These trees are evergreen and coniferous; and the one formerly exhibited at the Crystal Palace, Sydenham, but destroyed by fire in 1866, has been designated the Wellingtonia gigantea. It is stated that in Tasmania there exists a mammoth Eucalyptus, or Gum tree, standing at the foot of Mount Wellington, near Hobart Town, which is the first in circumference at the base, or a diameter of about 50 feet, and its height has been estimated at 300 feet. But this is 'a mere guess,' says a contemporary writer, 'when compared to the finest mammoths which grow on the slopes of the Sierra Nevada, in California, about 300 feet above the level of the sea. These Californian monsters are of the same genus, though perhaps not of the exact species, as the ancient orders of Lebanon. The California grove is at about the same altitude, the same latitude above the sea, and has the same climate as those mighty forests of the mountains of Lebanon from which King Hiram supplied the timber for building Solomon's Temple. Of those Lebanon forests only some half-dozen grandest and noblest trees now remain; but the summit of that lofty range where in California we have a grove of the most magnificent specimens that we have ever beheld. There they have stood, and have continued to grow, while all around them, in a circumference of a thousand miles, the ancient mountains and their trees have been swept away, and there they stand, the living patriarchs of bygone years.

Judging from the [illegible] rings of layers deposited by the [illegible] annually, the age of the largest of these giant trees [illegible] appears to exceed [illegible] years. The [illegible] which [illegible] are [illegible] of [illegible] period [illegible] the present period. The [illegible] of which the [illegible] trees are the [illegible] are [illegible] [illegible] In the first place we [illegible] [illegible] the [illegible] of the [illegible] trees [illegible] [illegible] of which the [illegible] [illegible] [illegible]

from the centre pith to the outer bark, the botanist is enabled to estimate the number of years it has existed; as illustrated by the annexed diagram of the horizontal section of the trunk of an exogenous tree, at the end of the fifth year.

Horizontal Section and Zones of an Exogenous Tree.

In the above section are represented the central core, and the five zones or concentric rings of wood, with the bark, the cambium, and the medullary rays.

When the tree is sound there is little difficulty in counting the zones, and ascertaining its age. The plan adopted by Adanson, in calculating the vast ages of the Baobabs of Africa, was first to take a square inch, and count the zones contained therein; then to multiply the number of zones by the number of inches from the pith to the bark, which gave the entire number of zones, and the exact age of the tree. The same method is usually employed in calculating the ages of other gigantic trees; among which may be enumerated the following, with the periods of their respective ages:—

	Years old.
Palms,	300
Cherodendron,	327
Ulmus (Elm),	355
Cupressus (Cypress),	388
Hedera (Ivy),	448
Acer (Maple),	516
Larix (Larch),	576
Castanea (Chestnut),	626
Citrus (Lemon, Orange, &c.),	509, 640
Platanus (Plane),	720
Cedrus (Cedar),	800
Juglans (Walnut),	900
Tilia (Lime),	530, 800, 825, 1076
Abies (Spruce),	1200
Quercus (Oak),	800, 860, 1000, 1600
Olea (Olive),	1000, 2000
Taxus (Yew),	1214, 1466, 2588, 2880
Schubertia (Taxodium),	3000, 4000
Leguminosæ,	2052, 4104
Adansonia (Baobab),	5000
Dracæna (Dragon Tree),	5000

Trees frequently attain a great age, of which several remarkable individual instances have been recorded. [Age of Trees.]

For further information on the subject of trees the reader should consult Loudon's *Arboretum et Fruticetum Britannicum*, and Selby's *British Forest Trees*.

TREFOIL. [Tripolium.]

TREFOIL, in Architecture, an ornament of three cusps in a circle, like three-leaved clover; from the Latin *trifolium* (*tres*, 'three,' and *folium*, 'a leaf').

TREGONY. [Cornwall.]

TREMANDO, or TREMOLO, in Music, a direction for one of the graces of melodious expression, consisting in the reiteration of a single note, or in a general shake of the whole chord. It is designated by the sign *tr*.

TREMANDRA'CEÆ, a natural order of plants belonging to the syncarpous group of polypetalous Exogens. It consists of slender shrubs very much resembling heaths, and contains only two genera, *Tetratheca* and *Tremandra*.

TREMELLA. [Tremellini.]

TREMELLI'NI, the name of the last order of the cohort *Hymenomycetes*, in Fries' arrangement of the natural order *Fungi*. The type of this order is the *Tremella*, a genus constituted by Dillenius, and applied to a variety of forms of Fungi belonging to this group, but now arranged under other genera. They included all kinds of the lower forms of plants which possessed a gelatinous character; and as these exhibited a tremulous motion on being shaken, they received this name.

The plants of this order are known by their amorphous character, having a soft gelatinous appearance, and looking like gummy exudations of the substances on which they grow.

T. fimbriata, Fringed Tremella, has a violet colour when young. If boiled in water it does not lose its shape or colour, but yields a deep brown infusion, which might be made useful in dyeing. *T. mesenterica*, Orange Tremella, or Yellow Nostoc, is known by its orange-yellow colour. It is one of the most common of the species, and is found all the year round on decaying branches and sticks, and on the stumps of trees. *T. albida*, Whitish Tremella, abounds on fallen trees, branches, &c., in winter and spring.

The genus *Exidia* possesses a gelatinous, homogeneous receptacle, covered above only with a papillate hymenium. Its most remarkable species is the *Exidia Auricula Judæ*, Jew's Ear, so named from its resemblance whilst growing to a human ear. *Exidia glandulosa*, Glandular Exidia or Witches' Butter, is an effused mass, thick and undulated, varying from a whitish-brown to a black colour. It is frequently found in autumn and winter on trunks and branches of trees, especially the ash.

The genus *Dacrymyces*, sometimes called Tear-mould, yields species which attack wrought wood, and produce what is called dry-rot. The *D. moriformis*, Mulberry Tear-mould, is of a rich deep purple colour, and grows on wrought wood in a clustered rounded form resembling a mulberry. The *D. violaceus*, Violet Tear-mould, is found on the trunks of pear and apple trees, and resembles very much the crust of port wine. *D. stillatus*, Common Tear-mould, has a yellowish orange colour, and occurs most frequently in the wood of firs.

There are three other genera belonging to the order —*Nœmatelia*, *Agyrium*, and *Hymenula*—each of which has one species.

TRE'MITI ISLANDS, a group of five small islands in the Adriatic, off the coast of Naples. They are separated by channels about half a mile wide, and the three largest are called San Domino, San Nicola, and Capperara, the others being mere uninhabited rocks. San Domino is between 5 and 6 miles in circumference, and is more accessible and more productive, especially of oil and fruit of various sorts. The best harbour in the group is on the coast of Capperara. These islands were called by the ancients Diomedeæ, from a tradition that Diomedes was buried in one of them. The vast and splendid monastery and church built on the isle of San Nicola by the Augustinian monks in the fifteenth century, and surrounded by strong bastioned walls, now forms the fortress of Tremiti. The fortifications were so strong as to enable the monks

to resist the attack of a formidable Turkish fleet in 1567. This island is about 3 miles round, and consists of a lofty rock which is steep towards the sea.

TRENCH (Fr. *tranchée*), in military works, is an excavation in the ground from 12 to 18 feet wide and 8 feet deep, and generally of considerable length, the earth being thrown upon one side in order to form a sort of parapet by which the soldiers in the trench may be covered from the view or protected from the fire of the enemy. [SAP; SIEGE.]

TRENT. [STAFFORDSHIRE.]

TRENT, or TRENTO. [TYROL.]

TRENT, COUNCIL OF. [COUNCILS.]

TRENTON. [NEW JERSEY.]

TREPHINE, or TREPAN, is a kind of saw employed in surgery for the removal of a circular portion of bone. For this purpose it is used in various cases, such as diseases requiring perforation of the antrum, necrosis with loose inclosed sequestra, abscesses in bone or under bones, &c.; but especially in injuries of the head and their various consequences, for which the removal of a portion of the skull is deemed necessary.

The trephine is now much more rarely required than in former times; not only because surgeons have learned that it is beneficial in few injuries of the head beyond those in which there are distinct signs of compression of the brain, but also because, in many of the cases in which it is necessary to remove portions of bone, the instrument called Hey's Saw is far more convenient.

TREPORT. [SEINE-INFÉRIEURE.]

TRESPASS is a wrong directly done to the person, to the goods and chattels, or to the lands and tenements, of any man.

To the person it may be by menace, assault, battery, or maiming [ASSAULT]; to either dead or live chattels, by taking them away or by injuring them; to lands and tenements, by entering upon them and injuring them. Trespass is the action by which a person in the actual and exclusive possession of property is protected against the forcible interference with it by those who are not entitled to it. By this action also he may recover damages for the injury done to his possession.

The possession which is sufficient to entitle a man to bring this action against a stranger is a bare possession without any proof of further title to the property; but the possession must be actual: an heir who is entitled to lands, but has never entered upon them, has no claim to this means of redress. The possession also must be exclusive: one who has only a right of common cannot bring an action for trespass for an injury done to the common, since others have rights co-existent with his own. A tenant during the existence of his demise may maintain it against the landlord himself if he enters upon the premises except for a lawful cause, as to distrain. The mere possessor of goods or cattle may maintain trespass against a stranger. With respect to goods, possession may be said to be of two kinds, possession in fact, and possession in law, sometimes distinguished by the terms actual and constructive possession. Either kind is sufficient to enable the possessor to maintain trespass. It is constructive if the property of goods has vested in a party, the mere property in such case being construed to draw after it and invest the owner with possession also.

To constitute trespass, the act done must be wilful, not the result of negligence, and have something of force in it, and the injury must be the immediate not the consequential result of the act. But it is not necessary that it should be done with the design to cause the injury complained of; it may be caused by mistake or ignorance. If one shooting at a mark hits a bystander, he is guilty of trespass. A sheriff commits an act of trespass if he takes the goods or arrests the person of B, mistaking him for A. In trespass, all persons who assist in the act done, or cause it to be done, or, if it is for their use, assent to it afterwards, are considered as principals, although not actually present at the doing of the act. If an act is done by a servant wilfully, and in the discharge of his business as servant, the master is liable. But if it is wilful on the part of the servant, and not in discharge of his master's business, the latter will not be liable unless by such assent as is above stated.

As to malicious injuries to property, see the Act 24 & 25 Vict. c. 97.

In Scotland trespass at common law is prevented by the process of *Interdict*, similar to the English *Injunction*. There are special Acts to punish trespass on game and salmon, and a recent Act to punish trespass on lands, 28 & 29 Vict. c. 56 (1865).

TRÈVES (Ger. *Trier*), one of the five circles or districts of the Prussian Rhein-Provinz, is bounded N. by the circle of Aix-la-Chapelle, E. by that of Coblentz, W. by Birkenfeld and the Bavarian Rhein-Kreis, S. and S.W. by France, and W. by Belgium. The area is 2775 square miles, and the population in 1861 was 544,228, inclusive of 7076 troops. The face of the country is hilly, with a considerable extent of forest and pasture land, but not much that is adapted to tillage. There are mines of iron, lead, calamine, copper, and coal. A good deal of wine is produced on the banks of the Moselle. The manufactures are of various kinds, but none of any considerable importance. The chief towns are—TRÈVES, *Saarbrücken*, and *Saarlouis*. *Saarbrücken* is about 40 miles S. from Trèves on the Saar, which here becomes navigable and is crossed by a bridge leading to the suburb of St. Johann. It has a castle, which was formerly the residence of the princes of Nassau; a gymnasium; steel and iron works; factories for the making of woollen cloths, pins, nails, and hardware; potteries; tanyards; and a population of 9251, who also trade in varnished leather, glass, timber, and coal. The town was founded in the tenth century, was given to the church of Metz by the Emperor Henry III., and subsequently governed by its own counts till 1380, when it came by marriage into the family of Nassau. It was afterwards fortified, and suffered much by war. In 1676 it was almost entirely burnt down, and its fortifications dismantled. *Saarlouis*, a well-built, strongly-fortified town on the frontier of France, which is entered by two gates, is situated 12 miles N.W. from Saarbrücken on the left bank of the Saar, and has 6849 inhabitants. The fortifications are hexagonal in form, and are composed of six bastions with five ramparts planted with trees. This was the birthplace of Marshal Ney. Near here are mines of iron, lead and coal; and leather, steel-ware, wire, and firearms are manufactured. Saarlouis was founded by Louis XIV., and was strongly fortified by Vauban. It belonged to France till 1815, and now forms an important border fortress.

TRÈVES (*Trier*), the capital of the district of Trèves, is situated 60 miles S.W. of Coblentz, in 49° 46′ N. lat., 6° 38′ E. long., on the right bank of the Moselle, over which there is a stone bridge of eight arches, 690 feet long and 24 feet wide, and with piers of the Roman period, consisting of enormous blocks of lava. The town lies in a valley of extraordinary fertility, bounded by low hills covered with vines, and is undoubtedly one

of the oldest cities in Germany. When Julius Cæsar was in Gaul, the Tréviri were a powerful people; their chief city was afterwards called Augusta Trevirorum. In later times this town was the residence of several emperors. It was nearly annihilated by the barbarians, yet subsequently almost recovered its ancient splendour under its archbishops. It was taken by the duke of Marlborough in 1704, and during the wars of the eighteenth century suffered greatly, being re-captured by the French five times. It was then the capital of the department of Sarre. Under the government of Prussia, to which it was assigned by the congress of Vienna, it has to some extent recovered its importance. The population in 1861 was 17,759, exclusive of a garrison of 3456 men. The manufactures consist of woollen and linen cloth, worsted, carpets, hats, porcelain, soap, glue, leather, tobacco, and refined wax; the trade, for which the Moselle affords great facilities, is chiefly in the above articles of manufacture, and in fruit and wine. Boats for the navigation of the Rhine and the Moselle are built here. Trèves is the seat of a bishop and chapter, and of several tribunals and public offices. The university, founded in 1454, was suppressed in 1794, and is now called a gymnasium: it has a library of above 70,000 volumes and 2000 MSS. There is a museum full of valuable antiquities, a college for the education of Catholic clergymen, several hospitals and schools, and a theatre. The ancient electoral palace, now converted into barracks, stands partly on the site of an immense Roman edifice, the walls of a fragment of which still remaining are 90 feet high and 10 feet thick. The cathedral of St. Peter and St. Helena, in the earliest Byzantine style, is remarkable for its altars and marble gallery, rich old chasubles and missals, and famous relics, among others the HOLY COAT, the exhibition of which at various times has brought immense sums into the treasury of the citadel. The Liebfrauenkirche ('church of Our Lady'), built between 1227 and 1248, adjoins the cathedral, and is one of the finest specimens extant of the light and elegant style of pointed architecture. The ancient abbey of St. Martin, a noble edifice, is now used as a porcelain manufactory. At one extremity of the open space in front of the electoral palace are the ruins of the Roman Baths, formerly called the White Gate. Among other Roman remains are the amphitheatre, portions of an aqueduct, the bridge over the Moselle, and the Porta Nigra, or Black Gate, one of the most remarkable Roman monuments in the north of Europe. It was four stories high on each of the flanks, though there are only three stories remaining in one of them. In the centre occur two arched passages, each 14 feet wide, with two stories over them. All the stories are ornamented with Tuscan columns, and pierced with windows to light the apartments. The length of the building is 115 feet, the depth 47 in the centre and 67 in the two wings, of which the one that is complete is 91 feet high. It is built of massive stone, and is indestructible except by violence. It was probably built in the time of Constantine the Great. The interior at present contains a great number of Roman antiquities found at Trèves and in the neighbourhood. Some of the sculptures have great merit. St. Ambrose, one of the fathers of the church, was born at Trèves, and St. Jerome studied there.

TREVISO or TREVIGI, a city of N. Italy, on the Sile, in the government, and 6 miles N. of Venice, on the railway from thence to Trieste. It is surrounded by strong walls and bastions, and inclosed by a wet ditch, supplied with water from the Sile. The surrounding country is level and fertile, producing wine, silk, &c. The city is entered by three gates, has spacious streets and large squares, and a great number of handsome houses, generally lined by arcades, and often possessed of small but well-planted gardens, which give the town a very pleasing appearance. The principal buildings are the cathedral, a fine but unfinished structure of the Lombards, containing an altar-piece by Titian, and other paintings by Bordone and Domenichino; the church of San Nicolo, a large Gothic edifice; the courthouse and new prison, town-house, register-office, hospital, library of 30,000 volumes, a *monte-di-pieta;* two theatres, both handsome buildings; and the civil hospital. The manufactures consist chiefly of silk and cotton goods, and cutlery; the trade is in corn, cattle, and fruit, and there is an important annual fair which lasts fifteen days. Treviso is the see of a bishop, the seat of provincial and city courts and offices; and possesses a botanic garden, agricultural society, diocesan seminary, and athenæum of science and literature. It was formerly the seat of the celebrated university afterwards transferred to Padua. The population of the town in 1861 was 25,000. It is a place of great antiquity, and is supposed to have been a municipal free town under the Romans. On the decline of the empire it was taken possession of by the Huns, then by the Ostrogoths, and by the Lombards, who made it the capital of their two margraviates, under the name of Marca Trevigniana. During the feuds between the Guelphs and Ghibellines it formed part of the Lombardic league, and became independent. In 1344 it voluntarily placed itself under the government of Venice, whose fortunes it has since followed. Totila, king of the Goths, and Pope Benedict XI., were born in Treviso. Under the French it was the capital of the department of Tagliamento. Napoleon conferred the title of Duke of Treviso on Marshal Mortier.

TREWCA'CEÆ, a natural order of plants belonging to the rectembryose group of incomplete Exogens. This order has for its type a single genus, *Trewia*, which was named after the German botanist, Christoph Jacob Trew. Its plants are natives of tropical India, and their properties are at present unknown, nor is their structure well understood.

TRIAD, in Music, a compound of three sounds, which being naturally divisible into a major and a minor third, has been named the 'harmonic third.' Its name refers to its being formed on a third, a fifth, and the bass or fundamental sound.

TRIADS, the poetical chronicles of the Welsh bards, in which all the facts recorded are thrown into the form of triplets. They are not of greater antiquity than the reign of Edward I.

TRIAL, the means adopted for the purpose of ascertaining facts in issue in common law proceedings, whether civil or criminal. The equity courts have also the power, where they think it convenient, in the case of disputed facts, of directing an issue to be tried at common law, and may now also try before their own judges and a jury certain matters. The kinds of trial are properly only two: 1, that where the court itself decides upon the evidence without the intervention of a jury; 2, that where the jury decides.

A peer of Great Britain indicted capitally is entitled to be tried by the peers of Parliament assembled in the court of the Lord High Steward of Great Britain, who is a peer nominated to that office by the crown for the occasion. The proceedings of the trial are carried on in the same way as on a trial by jury, and judgment is

pronounced according to the opinion of the majority, which must consist of at least twelve. Cases of impeachment by the Commons are also tried by the Lords.

A Trial at Bar resembles the ordinary cases of trials by jury, except that instead of its being presided over by a single judge, all the judges of the court in which the action is brought are in attendance. It is granted on application to the court, but only in cases of great difficulty and importance. In informations exhibited by the attorney-general, as law-officer of the crown, he is entitled to a trial at bar.

New Trial. After a trial has been already had, it is competent to the court in which the action is brought to grant a new trial, on an application made, and grounds shown for supposing that justice has not been done between the parties; and that the case is of sufficient importance to warrant such a further expense. These grounds are various, such as a misdirection by the judge, a verdict against evidence, excessive damages, misconduct of the jury, &c.

In Scotland jury trial in civil cases is confined to the Court of Session. *Trial at bar* before the full bench or more than one judge is unknown. The jury in criminal cases consist of fifteen, and may give a verdict by a majority. In civil cases the number is twelve and the verdict must be unanimous, but after deliberation of three hours a verdict by nine is received, 17 & 18 Vict. c. 59 (1854). A lord ordinary may take trials and give a special verdict without a jury, and by consent of parties a lesser number of jurors may be taken in civil cases. In Sheriff courts trial by jury in civil cases is unknown except under some special statutes; but in cases above the value of 40*l.*, a case may be removed to the Court of Session for trial by jury.

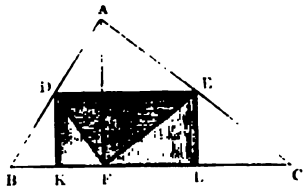
TRIAL BY BATTLE. Trial by battle was unknown to the Greeks and Romans, but it was a natural growth of the mingled superstition and ferocity that characterized the centuries of war, confusion, and change which followed the fall of the Roman empire, and preceded the establishment of the kingdoms of modern Europe. It first arose in Germany, and the Germans introduced it into France. It was allowed both in civil and criminal affairs, was regulated by law, reduced to a system, and attended by many curious ceremonies, which were strictly observed and rigidly enforced, and which will be found minutely described in the 'Style' of Dubreuil. Gondebaud, king of the Burgundians, was the first who legalized it, in the year 501, by a formal law called *Loi Gombette*, which runs in the following terms—'We have observed with pain that the obstinacy of pleaders and a censurable love of gain have corrupted the administration of justice among our subjects, to such an extent that, very frequently, they do not hesitate to swear as to things of which they are ignorant, or to perjure themselves with regard to facts which they know. Anxious to put an end to such criminal practices, we ordain, by the present law, that whenever a cause shall arise among our subjects, and the defender or accused shall have offered to deny on oath that he owes what is demanded of him, or that he has done that of which he is accused, the difference shall terminate in manner following:—We will, that the judges refuse not the combat, if the party to whom the oath would have been offered refuses it and declares, confident in the truth of his cause, that his adversary may be convicted by force of arms.' It thus appears that the prevalence of perjury, as well as the superstitious idea that God would interfere to protect the innocent and punish the guilty, had a good deal to do with the institution of the judicial combat or trial by battle. Three hundred years afterwards the capitularies of Charlemagne admit and regulate it; but in a capitulary of 805 an attempt is made to stop the effusion of blood by ordering the royal officers to exert every effort to appease private quarrels, and in the event of their failing to do so, they are required to bring the parties before the emperor, in order that he may try to reconcile them. Two canons of the council of Valencia, held in 855, also show the beginning of a reaction against this absurd and bloody practice; but it was too strongly established to be easily overthrown, and too much in accordance with the faith and the manners of the age; and up to the reign of Charles IX. of France—or the latter end of the sixteenth century—we find ordinances authorizing and regulating it in all sorts of affairs. It was definitively abolished by an ordinance of that monarch in 1566. To such an extent was the practice carried in France in the twelfth century, that Louis VII. was obliged to promulgate a law forbidding resort to it for a less sum than 2*l.* 15*s.* of our money. So that for that sum, and anything above it, a pugnacious litigant might peril his own life, and compel his opponent to risk his also. The trial by battle was never so common or so popular in England as it was in France. It was, however, allowed in doubtful cases, and especially where a crime not capable of notorious proof was charged. The gentleman fought on foot or on horseback with all his weapons of attack and defence; the plebeian on foot with a club and target. Women and ecclesiastics, who could not combat in person, were allowed to fight by a champion. If the combat related to a civil matter the vanquished party lost his claims and paid a fine; if he fought by proxy, his champion was liable to have his hand struck off. In criminal cases the appellant suffered, in the event of a defeat, the same punishment which the law awarded to the offence of which he accused his adversary. We still possess in the modern duel a relic of the trial by battle; the former being based upon a false sentiment of honour, as the latter was founded upon a false belief in the interference of God. The duel is now happily dying out; but in former days, and especially in France, it shed rivers of blood. Seconds as well as principals fought, and for the most trifling causes—often merely to decide who was the bravest and the better swordsman. Nay, sometimes a challenge was thrown into the air; and the fool who threw it, and he who happened to pick it up, fought it out with their rapiers. Henry IV. complained that he lost more gentlemen in duels than in his wars; and it has been estimated that, during his reign, no fewer than 8000 persons fell victims to this cruel and senseless practice.

TRIANGLE (from *tres*, 'three,' and *angulus*, 'a corner'), the simplest of geometrical figures, is a figure having three angles, and consequently three sides. This consequence is usually made the definition; and the same thing occurs in Euclid, whose word is τρίγωνον in the 'Elements,' though it is τρίπλευρον in the definitions prefixed.

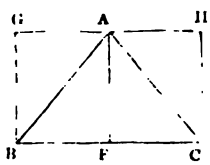
A triangle may be drawn upon any surface, and have any sort of lines for its sides: but it is not usual to consider any except *plane triangles* drawn on a plane with right-lined sides, and *spherical triangles* drawn on a sphere with arcs of great circles for the sides.

The two most important properties of the triangle are, that the sum of its angles is always two right angles, and that the area is half that of a rectangle of the same base and altitude. Both of these propositions

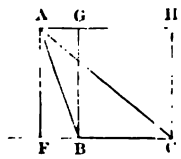
admit of such practical verification as would make them perfectly intelligible to those who do not understand geometry. Take the greatest angle, BAC, of a triangle



cut out in paper, and fold the paper so that A may rest on BC at F, the part ADE folding over DFE. Then it will be found that by further folding, ECL can be brought over EFL, and BDK over FDK, so that the three angles of the triangle KFD, DFE, and EFL, are so placed that the first side of the first and the last side of the last, KF and FL, are in the same straight line, and the three make up the two right angles KFA, AFL. Again the triangle BAC is either the sum or difference of the two right-angled triangles FAC, FAB,



which are the halves of the rectangles FACH, FABG, the sum or difference of which is the rectangle BGHC; whence the triangle is the half of the rectangle BGHC.



The three lines which bisect the angles of a triangle meet in one point, which is the centre of the inscribed circle; and the three perpendiculars which bisect the three sides also meet in one point, which is the centre of the circumscribed circle. Moreover the three lines drawn from the vertices bisecting the sides meet in one point, which is the centre of gravity of the triangle: as also do the three perpendiculars drawn from the vertices to the sides.

The number of isolated theorems which might be given on this subject is very large, but there is little, unconnected with the trigonometrical formulæ, which is of use in application.

TRIA'NGULA and TRIA'NGULUM AUSTRALE (constellations). The first (the Triangles) is a northern constellation, surrounded by Perseus, Andromeda, Aries, and Musca. There is also the Little Triangle, added by Hevelius. The second, or Southern Triangle, is a constellation of Bayer, lying between Ara, Centaurus, and the South Pole.

TRIAS. [Geology.]

TRIBES (Lat. *tribus*, probably akin to the numeral *tres*, and the Æolic Greek τριττύς, or τριττύς, 'a third part'), a subdivision of the Roman people, which appears to have existed from a remote antiquity. According to Dionysius, Romulus originated this classification, dividing his subjects into three tribes, and each tribe into thirty curiæ. These three are stated by Livy to have been the Ramnenses, Titienses, and Luceres. Servius Tullius swept away his predecessor's disposition, and re-arranged the people into twenty-six tribes, according to one authority, or thirty-one, according to another. Niebuhr suggests that ten of these were lost by the cession of the lands on the Etruscan bank of the river to Lars Porsena, as Livy records only twenty-one tribes in existence soon after the great battle of the Lake Regillus, which number remained without alteration for at least a century. The whole question, however, is involved in an atmosphere of obscurity which the keenest speculation cannot satisfactorily penetrate.

Long before the foundation of Rome, other nations had been divided into tribes, the number varying from three, as among some of the Greek peoples, to twelve, as among the Hebrews. 'This division,' says a recent writer, 'like that of the Celtic clans, was based essentially on a religious foundation, each tribe having its common sacrifices and festivals; and these tribes, standing on an equality with each other, must be carefully distinguished from the populations which were held in subjection. Thus, the Thessalians had their *Penestæ*, the Spartans their *Helots*; but neither Penests nor Helots were included in the tribal divisions of their conquerors. The Dorians, called in the 'Odyssey' Τριχάϊκες, or 'the people of three tribes,' were subdivided originally into the Hyllæans (said to be named from Hyllus, a son of Heracles), the Dymanatæ, and the Pamphyli, the last-named furnishing a parallel to that of the Panhellenes. To these three tribes others were from time to time added in different places. Thus, eight tribes are mentioned in Corinth, and four in Tegea. The twelve tribes of Elis, reduced to eight by a war with the Arcadians, seem to have been geographical divisions. The Ionian division appears to have been fourfold. Those of Attica, which, according to some traditions, had borne other names, were the Celeontes, the Hoplites, the Argades, and the Ægicoreis. The origin of these names can be accounted for only by conjecture, and the last three are explained etymologically as representing, respectively, the armed men or warriors, the husbandmen, and the goatherds.'

The earliest form in which men assembled as a community, with mutual interests and close domestic, social, and political relations, was, undoubtedly, the tribe. It has generally been supposed that it originated in a single family, whose descendants would naturally be bound together by a variety of circumstances, and who would recognize as their chief either the most capable man among them, in which case his authority would be elective, or the eldest son of the eldest son, on the hereditary principle of monarchy. This family, in the course of time, would ally itself, either by marriage, or for defensive purposes, with other families, or, if strong enough, would employ force to compel them into union. Some modern writers have endeavoured to contest the truth of this explanation, and to account for the origin of tribes by what is called a hypothesis of development, but the weight of evidence seems to us in favour of the old and long accepted theory.

TRIBONIAN. [Justinian's Legislation.]

TRI'BULUS, a genus of the natural family of *Rutaceæ*, the fruit of which is armed with prickles. It is termed *Caltrops*, from the pronged instruments formerly employed and still in use in the East for obstructing the progress of cavalry. The species are found in the south of Europe and the subtropical and tropical parts of the world. *T. terrestris* is sometimes cultivated in the gardens of the West Indies on account of the sweet scent of its flowers.

TRIBUNAL OF FIRST INSTANCE. [Department.]

TRIBUNALS OF COMMERCE are courts established in most of the large towns of France for the quick

and inexpensive decision of commercial disputes, and all matters relating to trade and debts. The presidents and judges are chosen from among the most intelligent and respectable merchants of their respective towns, and serve without emolument. A president and two judges form a court, which sits every day except Sunday. The clerks are the only officers who are paid. The expense of these courts for the whole of France—over 200 in number—does not much exceed 7000*l.* sterling. Their decisions are admitted to be highly satisfactory and equitable.

TRIBU'NUS (φύλαρχος), according to the etymology of the word, signifies any officer who is at the head of a tribe [TRIBE], and conducts either its internal administration, or represents it in its relations to other powers in the state. This signification applies indeed to some of the officers of this name who occur in the history of Rome, but in regard to others it cannot be accepted. There were tribunes of the three Romulian tribes; a Tribunus Célerum, an office which existed only under the kings; and the tribunes of the thirty Servian tribes. The investigation of the functions of these officers belongs to the history of Rome.

The Tribuni Plebis were the most important among the many officers bearing the name, and whenever tribunes are mentioned without any further qualification, these alone are meant. In the year B.C. 494, when the plebeians had been driven by the oppression of the patricians to secede to the Mons Sacer, peace was concluded between the two orders on condition that the plebeians should be allowed magistrates of their own to protect them against the patrician magistrates, and whose persons should be sacred and inviolable. It was further agreed, that whoever should maltreat, kill, or compel a tribune to anything by force, should be outlawed, and his property forfeited to the temple of Ceres. These agreements, however, were insufficient to protect them against various annoyances of the patricians, and it was found necessary, soon after the institution of the tribunate, to give still more security to the exercise of their power. A law was accordingly passed forbidding any one to interrupt or disturb the tribunes in their transactions with the plebs, and that any one who should act contrary to this law should give bail to the tribunes for any fine they might propose to the comitia to inflict upon him; those who refused to give bail forfeited their life and property. The inviolability of the tribunes was finally established after the time of the decemvirate by a law of M. Horatius.

Some authorities state that two tribunes were elected on the Sacred Mount, and that these afterwards chose three colleagues; others say that five were elected at once; and others again that no more than two were appointed. But the probability is in favour of five tribunes, so that one was taken from each of the five Servian classes. Thus much only is certain, that in the year B.C. 457 the number was increased to ten; so that if they really bore any relation to the classes, each furnished two. Their history is an important element in the history of Rome. They were the organs of the democratic principle, and the instruments of its development. Sulla, among his other constitutional changes, reduced their power; but it was re-established by Cnæus Pompeius Magnus, B.C. 70.

In B.C. 23 Augustus received the office of tribune for life, and at intervals of five years he himself appointed one of his friends or relatives as his colleague in the tribunate. This tribunitia potestas of an emperor was conferred upon him by the senate, and was deemed equivalent to regal or dictatorial power with a popular name.

The Tribuni Militum cum Consulari Potestate were officers with consular authority, who were elected both from patricians and plebeians. The first were elected in 444 B.C. In B.C. 366 the office was abolished, and the consulship restored.

The Tribuni Militares, or Militum ('tribunes of the soldiers'), were a class of officers in the Roman armies, of whom at first there were four in a legion. In later times the number was increased to six, and their appointment was sometimes left altogether to the consuls. But this seems to have been an exception to the rule, for subsequent to that time we again find that the people had the election of a part of the tribunes. Their functions consisted in maintaining discipline among the troops, superintending their exercises and their state of health, in inspecting the sentinels, settling disputes among the soldiers, in taking care that they received their necessary provisions, and the like.

TRICHI'ASIS (τριχίασις) is a disease in which one or more of the eyelashes are turned inwards, so as to be in contact with the front of the eyeball. The irritation thus excited produces all the pain and other symptoms of inflammation of the conjunctiva, and if long continued may terminate in opacity of the cornea and complete blindness. For a permanent remedy, some of the operations for entropium must be performed, or the portion of the inner margin of the eyelid from which the inverted lashes grow must be removed with their bulbs.

TRICHILIA (Gr. τρίχα, 'in three parts'), a genus of *Meliaceæ*, containing but two or three African and about a dozen American and West Indian species. Some of these are trees, but most of them erect or climbing shrubs with unequally pinnate or trifoliate leaves and axillary panicles of flowers. The fruits of *T. emetica*, an Arabian species, are, as its name indicates, gifted with emetic properties, and the Arabian women mix them with the perfumes they use in washing the hair. The ripe seeds, in conjunction with sesamum, are compounded in an ointment esteemed a 'sovereign remedy' for the itch. The tree is of considerable stature, with thick clusters of whitish flowers, and pinnate leaves.

TRICHINA, a genus of *Nematoidea*, or Thread-worms, belonging to the class *Entozoa*, or internal parasites, known to observers in the specific form *Trichina spiralis*, which infests various lower animals and man. Much interest has come to be attached to this species because of the influence of trichinous flesh on the public health. It is thus of great importance to have a clear and intelligent knowledge of the natural history of a form whose bearings on health and industry are so close and vital. The presence of *Trichinæ* in human muscle was originally discovered by Professor Owen, and great attention has since been given to its history, structure, and habits by other helminthologists, both British and foreign. Among these may be named Curling, Wood, Farre, Bowditch, and Cobbold; Leuckart, Virchow, Herbst, Davaine, Henle, Siebold, Küchenmeister, Van Beneden, &c. Leuckart's 'Memoir' (*Untersuchungen über Trichina spiralis*, 1860) is very exhaustive, and will continue to supply students of this branch of natural science with well-authenticated facts regarding the development and migrations of this species.

The *Trichina spiralis* is exceedingly minute. When full grown the male is not more than $\frac{1}{18}$ of an inch in length; the female about $\frac{1}{8}$. The body is rounded and thread-shaped; the head is narrow and pointed, with a simple mouth in the centre; the male has a

bi-lobed tail; the cloacal opening being between the lobes. The female is plumper than the male. The young Trichinæ found in human muscle have the form of spirally-circled worms, in oval-shaped cysts resembling minute particles of lime. They can be detected by the naked eye. In some cases they are found in the voluntary muscles in great numbers, many thousands occurring in the flesh of one subject. Experiments have been made with the view of ascertaining the length of time required by the Trichinæ for attaining maturity, by feeding dogs, cats, mice, rats, pigs, &c., on trichinous flesh, and the larval forms were proved to reach sexual maturity in about forty-eight hours. Taken into the digestive organs they reach maturity in them, and then, boring their way, they migrate into the voluntary muscles, which soon begin to degenerate in consequence of their presence. 'The infested muscle,' says Leuckart, 'loses its true structure. The fibrillæ collapse into a finely granular substance, while the muscular corpuscles change into oval nucleated cells. The infected muscular bundle retains its original sheathing up to the time of the complete development of the young Trichinæ, but afterwards its sarcolemma thickens, and begins to shrivel at the extremities. The spot inhabited by the rolled-up parasites is converted into a spindle-shaped widening, and within this space, under the thickened sarcolemma, the formation of the well-known lemon-shaped or globular cysts commences by a peripheric hardening and calcification. The immigration of the trichina brood in masses produces very grave or even fatal consequences; peritonitis (from the embryos perforating the intestinal walls), pain, paralysis (from the destruction of the infected muscular fibres). In proportion to the quantity of imported parasites, the eating of trichinous meat is also attended with more or less dangerous symptoms, or even death, as a consequence.' The disease known as *Trichiniasis*, or the flesh-worm disease, is the result of eating trichinous flesh, especially pork infested with these parasites, which are to be met with in smaller or larger numbers in almost all pigs. It is thus of the greatest importance to see that in every case pork be most thoroughly cooked, and that the meat be obtained from healthy animals. Wherever pork is eaten raw, or in the the form of sausages, which have not been sliced and thoroughly fired, *Trichiniasis* is sure to prevail. Thus the periodic recurrence of this loathsome and often fatal disease in different parts of Germany, where chopped raw pork forms a favourite meal. Such passages as the following are of frequent occurrence in German newspapers:—'Six persons have fallen ill after eating raw beef mixed with chopped pork;' 'The death of twenty persons in Hettstädt has been caused by the flesh of an English pig, which was reared on a neighbouring estate, together with others.' The butcher who killed this pig partook of the flesh, and died. 'Eight persons fell ill with the trichina disease in Plauen; one died.' The paragraphs might be multiplied. The phases which this disease assumes in its different stages are now well known. 'The prophylactic treatment consists simply in the avoidance of uncooked meat. The medicinal treatment must vary with the stage of the disease. At first attempts must be made to expel the parasites from the intestines by purgatives and anthelmintics.' Among the latter, calomel is held by most to be the best. It is suggestive to remember that the Mosaic sanitary arrangements appear to have had this disease in view, when the Israelites were prohibited the use of pork and the flesh of other animals now known to be favourite hosts for the *Trichina spiralis*.

TRICHINO'POLY, a fortified city of Hindustan, formerly the capital of a Hindu principality, now included in the presidency of Madras, is situated about half a mile from the south bank of the river Cavery, in 10° 50′ N. lat., and 78° 49′ E. long., 38 miles W. from Tanjore, and about 90 from the Bay of Bengal.

The principality of Trichinopoly, a relic of the kingdom of Madura, of which it originally formed a part, retained its independence until 1736, when it was made tributary to the Mohammedan government. In 1741 it was taken by the Mahrattas, but was retaken in 1743, and in 1749 it devolved by inheritance to Mohammed Ali as nabob of the Carnatic. The civil and military government of the Carnatic, including the district and city of Trichinopoly, were ceded to the British in 1801, on the East India Company engaging to pay to the nabob annually one-fifth of the net revenue of the country, and providing for the principal officers of his government.

The city of Trichinopoly is situated on a rocky eminence surrounded by a fort, the walls of which are in a ruinous state. The citadel is situated at the northern extremity, and commands military operations carried on in any part of the vicinity. On the same rock stands a large and massive pagoda; and a square building containing a statue of Hanuman occupies the highest peak; while in the south face of the rock is a small sculptured excavation in the style of some of the cave temples at Ellora. Beyond the walls is St. John's church, containing the tomb of Bishop Heber, who was buried here in 1826. The inhabitants of Trichinopoly, exclusive of the garrison, number 30,000, and manufacture cotton cloths, harness, saddlery, cheroots, and jewellery, especially gold chains; besides the trade in which, the town is an emporium for a great variety of manufactures. Though one of the hottest stations in the Carnatic, Trichinopoly is the head-quarters of the south division of the Madras army, which has good cantonments here. The barracks cover a space of ground 6 miles in circumference. The town is well adapted for a military depôt, having a station on the railway from Madras to Tanjore, and the ordinary roads of the district are so good as to admit, at every season, of easy communication with Madras, Vellore, and Mysore. Hence also diverge the great roads leading to Tanjore, Madura, and Dindigal, the three chief stations in the south of India.

TRICHIURI'NÆ (Gr. θρίξ, 'hair,' and οὐρά, 'a tail'), in Ichthyology, a sub-family of the *Coryphænidæ*, of which the *Trichiuris*, or Hairy-tail, is the type. The body is linear and narrow; jaws long; teeth large and acute; and the ventral fins and finlets wanting.

TRICHIURUS, a genus of spiny-finned fishes, belonging to the sub-order *Pharyngognatha* ('gullet-jawed'), and family *Cepolidæ*, or Ribbon-fishes. The general features of this genus are—Head pointed; body without scales, elongated, compressed, thin, ribbon-shaped; no ventral fins, nor scales instead; no anal fin; tail without rays, ending in a single elongated hair-like filament; hence the name Hair-tail which is sometimes given to these fishes. The best known species is the Silvery Hair-tail (*T. lepturus*), which has not unfrequently been taken off the British coasts. The colour of this fish is a bright and shining silver; the fins grayish yellow; the edge of the dorsal fin is speckled with black, forming a spot between the first rays; the irides are golden. The mouth is furnished with a single row of teeth, about fifteen in number, on each side of the jaw; the vomer is destitute of teeth, but the palatine bones have each a row of very minute ones; the tongue is large, pointed, free, and perfectly smooth. The name *Blade-fish* is also

given to this species, from the thin, compressed form of its elongated body.

TRICHOMANES, a genus of ferns belonging to the sub-order *Hymenophyllaceæ*. *T. speciosum* is the only British species. It is extremely rare, and very beautiful, combining the characters of the true ferns, mosses, and sea-weeds. It is found at Killarney, Wicklow, and Anglesea in Ireland, in great beauty. The terms *T. radicans*, *T. brevisetum*, *T. alatum*, *T. Europæum*, and *Hymenophyllum alatum*, used by different botanists, are synonyms for the species named here. *T. speciosum* occurs in North and South America, in Madeira, and in the West India Islands.

TRICHOPTERA (Gr. θρίξ, 'hair,' and πτερον, 'a wing'), the Case-flies, an order of insects, according to Kirby, bearing a close resemblance to the Lepidoptera; their wings being covered with minute scales or hairs, whence the adoption of the name.

TRICHOSANTHES (Gr. θρίξ, 'a hair,' and ἄνθος, 'a flower'), a genus of the natural family of *Cucurbitaceæ*, so named from the corols being fringed, something like those of the Marsh Trefoil. Many of the species are edible, and from the long, often sinuous-formed fruit, they have been named Snake Gourds, the *Anguina* of some botanists. The principal edible species is *T. anguina*, a native of India and China. The fruit is often nearly a foot long, and for its sake the plant is much cultivated in different parts of Asia, the fruit being universally used in the stews and curries of the natives of India.

TRICOCCÆ. [EUPHORBIACEÆ.]

TRICOLOR (*tres, tria*, 'three,' and *color*, 'a colour'), a three-coloured flag, generally understood to mean the French national banner, blue, white, and red, adopted by the leaders of the first French Revolution. It is said that these colours were chosen because worn by the servants of the notorious 'Egalité,' Philip, duke of Orleans, and that they were first assumed by the people after the dismissal of the minister Necker in 1789. Some authorities take a different view of the origin of the Tricolor, and affirm that it was formed by uniting the three colours successively used in the French standards at different periods, namely, the blue of the banner of St. Martin, the red of the Oriflamme, and the white of the White Cross. Yet another version is, that the red and blue were adopted as the arms of the city of Paris, and the white as the colour of the army; their union symbolizing the alliance and fellowship subsisting between the soldiery and the great body of the people. The tricolor, however, is borne by other nations than the French, though with a different arrangement of colours. The present European ensigns of this description are:—France, blue, white, and red (divided vertically); Holland, red, white, and blue (divided horizontally—these colours were originally bestowed on the Dutch by Henry IV.); Belgium, black, yellow, and red (divided vertically); and Italy, green, white, and red (divided vertically).

TRIDENT (*tridens*, τριαινα) is any instrument of the form of a fork, with three prongs. In mythology it is the attribute of several marine divinities, such as Nereus (Virg., 'Æn.,' ii. 418) and the Tritons (Cicero, 'De Nat. Deor.,' ii. 35), but above all of Neptune (Poseidon). In these cases it is the same as the sceptre with other gods, the emblem of the power of these rulers of the waters.

TRIENTALIS, the name of a genus of plants belonging to the natural order *Primulaceæ*. The only British species is the *T. Europæa*, the European Chick-weed, Winter-green. It is distinguished from the American species by possessing elliptical instead of lanceolate leaves. It is rare in England, being only occasionally met with in woods in the northern counties; it is, however, abundant in many parts of the Highlands of Scotland. *T. Americana*, the American Chick-weed, Winter-green, has lanceolate leaves. It is found in mountainous districts in Canada and Virginia.

TRIER. [TRÈVES.]

TRIESTE, the Roman *Tergeste*, a flourishing commercial city and seaport of Austria, in the province of Illyria, is situated in 45° 38′ N. lat., 13° 46′ E. long., at the north-eastern extremity of the Adriatic, about 70 miles E. by N. from Venice, and has 65,874 inhabitants. It consists of two parts; the old city, standing on a hill with a castle on the summit, and the new town called Theresienstadt, which is built on level ground extending to the sea-side. The old town has narrow, crooked, dirty streets, especially in the Jews' quarter. The new portion, however, forms a regular square with broad streets crossing each other at right angles, and some canals, one of which, called the Great Canal, presents a very animated appearance. Between the two parts of the city winds the *Corso*, a spacious thoroughfare, opening successively into several handsome squares, the principal of which is the Piazza Grande, containing a fine public fountain, the chief hotel, and the column and statue of the Emperor Charles VI., to whom Trieste owes its modern importance. The principal public buildings are the exchange, the finest edifice in the town, situated in the above square, and adorned with a Doric colonnade, besides a spacious portal leading to a noble merchants' hall, while the story immediately above is employed as a casino; the Duomo or cathedral, of great antiquity, in the Byzantine style, somewhat resembling St. Mark's at Venice, and surmounted by a tower which is said to stand on a temple of Jupiter; the church of St. Peter; the Jesuit church, with a fine Corinthian colonnade; two Greek churches; the Protestant churches, synagogue, custom-house, post-office, and old and new theatres. Outside the town, on the sea-shore, is the new lazaretto, one of the largest and best arranged in Europe.

The harbour is of easy access, and completely sheltered except to the N.W., from which, though accidents seldom occur, a heavy sea is sometimes thrown in. It is deep enough to admit vessels of 300 tons to its quays, and ships of any size anchor safely at a short distance off in the roads. It is in the form of a crescent, one side of which is formed by the Theresien mole, projecting N.W. into the sea, and terminating in a broad platform, occupied partly by a fort, and partly by an intermittent light 106 feet above the sea. On the north side is a quarantine dock, surrounded with hotels and every other convenience. Close to the harbour are extensive building docks. The city is partially intersected by the Maria Theresa Canal, by means of which vessels can load and unload at the doors of the warehouses.

Trieste is the great emporium for the trade of the Austrian empire by the Adriatic. It is a depôt for warehousing goods from the Black Sea, Turkey, and Egypt, and the route through it has been successfully employed for the transit of the overland mails between England and India. The trade began rapidly to increase about the middle of the last century, when the Empress Maria Theresa made great improvements in the harbour, constructed the Maria Theresa Canal, and declared it a free port. The principal exports are corn, rice, wine, oil, wax, flax, hemp, tobacco, silk, wood, hides, marble, iron, lead, quicksilver, copper, alum, vitriol, silk stuffs,

printed cottons, coarse and fine linen, soap, leather, glass, and liqueurs. The principal imports are colonial produce, raw and spun cotton, cotton goods, dried fruits, hides, salt fish, camels' hair, &c. Trieste possesses a large mercantile navy, and is the head-quarters of the Austrian Lloyd's Steam-packet Company, which in 1867 possessed a fleet of seventy-five steamers, trading to Venice, Alexandria, Varna, Constantinople, &c. It has a larger amount of shipping than any other port in the empire. In the last published report it is stated that in the previous year the number of vessels which entered the harbour was 10,148, of 772,996 tons burthen. The value of the imports is annually about 5,500,000*l.*, and of the exports, 4,500,000*l.*

Trieste is a bishop's see, the seat of an imperial academy, a school of navigation, and numerous other schools and learned associations. It has many banking establishments, insurance offices, newspapers, &c., and is the residence of consuls of most commercial nations. Its manufactures are varied, and in some branches extensive. The principal articles are white-lead, wax candles, soap, rosoglio, spirits, playing cards, earthenware, and morocco leather. A great number of vessels are also built, and an active shipping trade is carried on in the bay. There are several dyeing houses, sugar refineries, potteries, distilleries, and rope-works.

Trieste is an imperial free town, and attached and belonging to it is a territory, 46 square miles in extent, consisting of the slopes of the *Triestiner Karst*, which are adorned with beautiful country seats and gardens, and decline somewhat abruptly towards the Adriatic shore. Most of the population is massed in the town, the other places being only small villages. Trieste existed under the Romans, but never rose to much importance till about the middle of the last century, when it attracted the attention and shared largely in the enlightened policy of the Empress Maria Theresa. She laid the foundation of a prosperity which has ever since continued to advance, and converted a comparatively insignificant town into the first port of the Austrian empire. In the middle ages it was the capital of an independent republic. The French took it in 1797 and 1805.

TRIETHYLAMINE, a powerful volatile organic base obtained from ammonia by substituting ethyl in place of the whole of the hydrogen contained in the former.

TRIETHYLPHOSPHINE, an organic base not unlike triethylamine, but containing phosphorus instead of nitrogen. In reference to phosphuretted ammonia it occupies the same position as does triethylamine to ammonia.

TRIFO'LIUM, the name of an extensive genus of plants belonging to the curvembryose division and to the papilionaceous tribe of the natural order *Leguminosæ*. It is one of the most extensive in the vegetable kingdom. Don enumerates 165 species. They are principally inhabitants of temperate climates, and are found in all quarters of the globe.

Trifolium incarnatum, Flesh-coloured Trefoil, or Scarlet Clover, is a native of the south of Europe. It is an annual of rapid growth, so that in southern climates it may be sown in summer after an early crop of corn, and fed off or cut before winter. It will stand the winter well if sown later, and give very early feed in spring. It produces a great abundance of seed if allowed to ripen; and on its introduction into England great profits were made by the first cultivators of it, by growing it entirely for seed. It is a valuable addition to the plants usually raised for fodder, and fills up an interval between other plants by its very early and rapid vegetation. T
of sowing the *Trifolium incarnatum* is simp
attended with very little expense. In the m
August, as soon as the crops of corn have been
the stubble is well harrowed to raise a small po
mould; the Trifolium is then sown at the rate
bushels of the seed, in the husk, per acre. Th
double advantage in sowing it in this manner:
the thrashing required to separate the seed, as
slight beating will separate the florets of the
spike sufficiently to sow them; and it vegetates
from the moisture retained in the husk which e
the seeds. A bush-harrow is drawn over the
cover the seed, and it is rolled with a barley-r
the land be of a firm nature, or with a heavier
it be a loose soil. Thus the Trifolium will
much more certainly than if the land had been r
ploughed and harrowed, which would have loo
too much. It is not advantageous to let the *Tr*
incarnatum be cut for hay. Its stem then has
a hard woody texture, and it makes very infer
Its principal value is to feed off with ewes an
before other feed is ready in spring, or to cut
for horses and cattle. It must be recollected
Trifolium incarnatum is a 'catch crop,' that
which comes in between two regular crops,
interfering with the rotation, and that it costs lit
than the seed, which is easily raised, or may be
at a very moderate rate.

T. arvense, Hare's-foot Trefoil, is a native of
and is abundant in corn-fields and dry pastures
Britain. Its soft hairy sub-cylindrical heads o
give it a very remarkable character. *T. mar*
Sea-side or Teasel-headed Trefoil, is a native of
in salt marshes and meadows near the sea-side
found on the east and south coasts of Britain. *T*
andrinum, Alexandrian Trefoil, or Clover, is a
Egypt, about Alexandria. It is the only Trefoi
cultivated in Egypt, where it is extensively
fodder for cattle. *T. medium*, Meadow-trefoil
clover, or Cow-grass, is a frequent plant in the
of Britain, where it can be recognized by its
stem, from which circumstance it is sometime
Zigzag Trefoil. *T. pratense*, common Purple
or Red Clover, has reddish-purple flowers, and
quent in meadows and pastures, where it blo
through the summer. *T. repens*, White Trefoil
or Dutch Clover, is very abundant in the meado
pastures of Great Britain, and next to the *T. inco*
and *T. pratense*, is valued and cultivated most o
the clovers. According to the soil on which it is
and the climate to which it is exposed, it assume
varieties. It is said to be the *Shamrock* of Irela
is worn by the Irish as the badge of their country
original shamrock does not appear to have been
but the *Oxalis acetosella*, which has also leav
three divisions.

TRIFO'RIUM, a term of uncertain origin, ap
the upper galleries formed by small open arche
those dividing the nave from the side-aisles of a
and beneath the clerestory windows, this inter
tier being within the sloping roof over the aisl
general the triforium is very shallow or narrow,
arches in front of it small and low, but there a
differences in these respects even in buildings of t
period and character. In the later styles the t
arches were filled with glass, the side-aisles being
with independent roofs so as to allow it.

TRIGAMOUS (Gr. τρεις, 'three,' and γαμος

riage'), in Botany, a term occasionally applied to plants embodying three kinds of flowers in the same flower-head. These are males, females, and hermaphrodites.

TRIGEMINUS, in Anatomy, the fifth pair of nerves arising from the side of the pons varolii, where its fibres are protruded to the central crura of the cerebellum. They are divided within the cranium into three branches, namely, the superior and inferior maxillary, and the orbital. The *superior maxillary* is subdivided into the *spheno-palatine*, *posterior alveolar*, and *infra-orbital nerves*; the *inferior* into the *internal lingual*, and the *infra-maxillary*; and the *orbital* into the *frontal*, *lacrymal*, and *nasal nerves*.

TRIGLA, a genus of Acanthopterygious osseous fishes popularly known as Gurnards, and belonging to the family *Loricati* in the arrangement of Cuvier. The head is mailed and angular; the opercle and shoulder-bones armed with spines; the body is scaly; there are two distinct dorsal fins; beneath the pectorals are three detached rays; the branchiostegous membrane has seven rays; both jaws and the front of the vomer are armed with fine velvety teeth. The gurnards are fishes always remarkable for singularity of form, and often for brilliancy of colouring. In the British seas the commonest species are the Gray Gurnard (*Trigla gurnhardus*), a silvery gray fish more or less clouded with brown and speckled with black; the Red Gurnard (*Trigla pini*), of a bright rose-red colour; and the Sapphirine Gurnard (*Trigla hirundo*), a large and handsome fish remarkable for the vivid green and blue hues of the inner surface of its large pectoral fins. The two last are most abundant on the western coasts. Several other rarer species are also inhabitants of the British seas. There are some beautiful small species in the Mediterranean, where also lives the Flying Gurnard (*Dactylopterus volitans*), which has the fin-rays of the pectorals connected by membranes, by means of which the fish is enabled to support itself for some time in the air in the manner of the Flying Fish. It is a handsome species, above a foot long.

TRIGLYPH (Gr. τρίγλυφος, 'thrice-cloven'), in Architecture, an ornament of the frieze, in the Doric style, consisting of two entire and two half channels, separated by flat spaces called *femora*, and supposed to represent the ends of the beams in the original temples of wood. [CIVIL ARCHITECTURE.]

TRIGONELLA, the name of a genus of plants belonging to the curvembryose division and to the papilionaceous tribe of the natural order *Leguminosæ*. The known species are upwards of thirty. Only five of them are European, of which one is found in Great Britain. *T. Fœnum-Græcum*, the common Fenugreek, is a native of the south of Europe, and also thrives on the coast of Asia Minor. In some parts of the south of Germany it is extensively cultivated as fodder for horses and sheep. It does not, however, appear adapted for the climate of Britain, on account of the uncertainty of the weather. *T. ornithopodioides*, the Bird's-foot Trefoil, is found in Great Britain, in dry sandy pastures, but not very commonly. *T. elatior*, Tall Fenugreek, found in Asia Minor and the Isle of Cyprus. *T. esculenta*, Esculent Trigonella, is a native of some parts of the East Indies, where its legumes are eaten by the natives as food.

TRIGONIA (Gr. τρίγωνος), a name applied by Lamarck to a genus of Ostracean Bivalves, most of the species of which are found fossil, but which has a living representative in the Southern seas, remarkable for the rainbow-like lining of the valves, *La Trigonacrie* of Lamarck.

The genus *Trigonia* has the following characters:—Shell thick, nacreous, subtrigonal, equivalve, inequilateral, the umbones rather small and but little recurved; hinge complex, dissimilar, the right valve having two great oblong teeth, diverging from the umbo, strongly furrowed, penetrating into two excavations, of the same form and equally furrowed, in the left; ligament external; muscular impressions not united by a pallial impression.

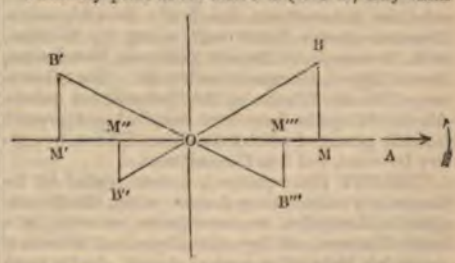
TRIGONOMETRY. This word signifies the measurement of triangles, but we might as well attempt to confine geometry within etymological limits as trigonometry.

In the modern division of the mathematical sciences, trigonometry, though still defined in books as the art of measuring triangles, really means the consideration of alternating or periodic magnitude; in which quantity is imagined to go through alterations of increase and diminution without end.

The most simple notion of periodic magnitude lies in supposing that the changes made are purely cyclical, or repetitions of the same for ever: as for instance, those which occur in turning a handle in a vertical plane. The number of revolutions traced out by the handle may be as great as we please, and the quantity of length of the circular arc described by its extremity may be as many times the circumference of the circle as we please, that is, as long as we please: but the distance of the handle from the ground is periodic, exhibiting perpetual increase and diminution as it rises and falls. Hence the circle naturally becomes a sort of standard of reference, and circular motion the primary idea, in all considerations of periodically changing magnitude. The arc, or the angle which it subtends at the centre, is the magnitude which increases without limit, all past revolutions being counted; and the lines which only depend on the position of the moving point in the circle, and not on the number of revolutions by which it has attained that position, are the periodic magnitudes in terms of which all others are expressed.

The periodic magnitudes connected with a varying angle, so far as they have separate designation, are the sine, cosine, tangent, cotangent, secant, cosecant, versed sine, coversed sine, and chord. A change is gradually taking place in the mode of conceiving these quantities, and one which it is very desirable to expedite: though slight in appearance, and producing no difference in results, it gives a great advantage in the consideration of formulæ. These elements *were* lines: they now often *are*, and in time always *will be*, the ratios of lines to lines.

From any point in the line O B (or O B′, &c.) which



is the variable boundary of the angle, draw B M (or B′ M′, &c.) perpendicular to O A. Let O M and M B be positive, O M′ and M″B″, &c., negative, as in the usual method of reckoning co-ordinates. Call B M, B′M′, &c., opposite to the angles, O M, O M′, &c., adjacent; and let O B, O B′, &c., be called hypothe-

nuses (and always considered positive). Then the sine of B O M is the fraction which B M is of O B, with its proper sign, in this case positive: but the sine of A O B″ is the fraction which M″B″ is of O B″, taken negatively, because M″B″ is negative. It is indifferent what hypothenuse is taken, by the property of similar triangles, and the following is the complete system of definitions, with the values written for the four angles. They give a slight degree more trouble at first, which is amply compensated in the superior ease with which all formulæ may be deduced, to say nothing of the advantage of avoiding the indefinite radius.

Definition.		A O B	A O B′	A O B″	A O B‴
Sine =	Oppos. side / hypothenuse	B M / B O	B′ M′ / B′ O	B″ M″ / B″ O	B‴ M‴ / B‴ O
Cosine =	Adjac. side / hypothenuse	O M / O B	O M′ / O B′	O M″ / O B″	O M‴ / O B‴
Tangent =	Oppos. side / Adjac. side	M B / M O	M′ B′ / M′ O	M″ B″ / M″ O	M‴ B‴ / M‴ O
Cotangent =	Adjac. side / Oppos. side	M O / M B	M′ O / M′ B′	M″ O / M″ B″	M‴ O / M‴ B‴
Secant =	Hypothenuse / Adjac. side	O B / O M	O B′ / O M′	O B″ / O M″	O B‴ / O M‴
Cosecant =	Hypothenuse / Oppos. side	B O / B M	B′ O / B′ M′	B″ O / B″ M″	B‴ O / B‴ M‴

Versed sine = unity — cosine.
Coversed sine = unity — sine.

The chord has long ceased to be regarded as one of the trigonometrical functions, and is always used in its old sense, as the line joining the extremities of an arc.

TRILLIUM, a genus of plants belonging to the natural order *Melanthaceæ*. *T. erectum* has a large, dark, simple flower.

TRILOBITES (Gr. τριλοβος, 'three-lobed'), a race of extinct fossil animals of the Crustacean order. The older collectors, even of the present day, may remember the curiosity with which 'The Dudley Fossil,' as it was ordinarily termed, was regarded. By some zoologists it was treated of as an insect under the name of *Entomolithus paradoxus*; by others the form was considered as that of an extraordinary *Testacean* with a shell of three lobes; whilst others thought that the trilobitic remains belonged to animals closely approximated to the *Chitons*, or at least not differing greatly from them.

It is now agreed on all hands that *Trilobites* are *Crustaceans*; and stand as a group (*Trilobitæ*) in the sub-class *Entomostraca*, and family *Branchiopodidæ*. Numerous generic forms occur among the trilobites, such, for example, as *Asaphus*, *Calymene*, *Homolomotus*, *Ilænus*, *Ogygia*, *Phacops trinucleus*, &c. The trilobites range from the Silurian to the Carboniferous periods. About 400 species have been described, and grouped into fifty genera, of which forty-six are Silurian, twenty-two Devonian, and four Carboniferous.

TRILOGY (Gr. τριλογια), a term applied by the Greeks to a series of three dramas, which, though complete in themselves, are nevertheless connected by a unity of interest, and form the independent tableaux of a complete historical or poetical picture. In the Greek theatre the 'Agamemnon,' the 'Chœphoræ,' and the 'Eumenides' of Æschylus (the *Oresteia*). and in the English theatre, the three parts of 'Henry IV.' of Shakspeare, are examples of a Trilogy. Frequently a satyric drama was added as a termination to the three plays, and the whole, in that case, was termed a *tetralogy*.

TRIM. [MEATH.]

TRI'MERA, the fourth section of the order *Coleoptera* among insects, according to the arrangement of Latreille. The insects popularly known as Lady-birds and Puff-ball Beetles are characteristic of the families composing it, which are all remarkable for brilliant colouring, being generally red or yellow, with black, red, white, or yellow spots. Individuals of the several species are so extremely variable and different from each other in their markings, as to render the construction of specific diagnoses in this family more difficult than in any other tribe of *Coleoptera*. They creep slowly, but fly well, and many kinds are gregarious. Their eggs are deposited in yellow patches among the plant-lice, so that the larva is hatched in the midst of its food. They abound in our fields and gardens, and are among the first beetles which come out in spring. They appear sometimes in immense swarms, and, spreading over the fields, cause needless alarm to the farmer, to whom, far from being a pest, they are a blessing, from the fierce war they wage against his enemies the aphides.

Some of the species are widely distributed, such as the very common *Coccinella septem-punctata*, which extends its range over all Europe and parts of Asia and Africa. In England we have six genera of *Coccinellidæ*, and more than fifty species.

It is doubtful whether all the insects of this tribe live on animal food. Mr. Darwin has observed them in places where they had no aphides to eat. They are frequently found on the summits of mountains at a very great elevation, as high as 9000 feet, and aphides are scarce in such situations.

TRIMETHYLAMINE, or TRIMETHYLIA ($3\,C_2\,H_3\,N$), an organic base resembling triethylamine, except that its radical is methyl instead of ethyl. It has a strong fishy smell, and is obtained from herring-brine, from guano, ergot of rye, putrid yeast, and other substances, as a colourless gas, which is easily soluble in water. It is also procured artificially by the action of iodide of methyl on dimethylamine.

TRIMMER, a political nickname applied in the reigns of Charles II. and William III. to those politicians who espoused neither the extreme opinions of the Whigs or the Tories, but occupied a midway or moderate position. Of these the most distinguished was that liberal patron of letters and accomplished writer, Charles Montague, earl of Halifax.—In Architecture, a trimmer is a piece of timber framed at right angles to the joists opposite chimneys or the well-holes of stairs. It receives the ends of the joists intercepted by the opening.

TRIMMER, SARAH, was born at Ipswich, January 6, 1741. Her father, Mr. Joshua Kirby, was known as the author of 'Dr. Brooke Taylor's Method of Perspective made Easy,' and 'The Perspective of Architecture.' At the age of twenty-one Miss Kirby was married to Mr. Trimmer. The first of her popular literary works was a small volume, entitled an 'Easy Introduction to the Knowledge of Nature,' 1780. It was followed, in 1782 and the two following years, by six volumes of 'Sacred History, selected from the Scriptures, with Annotations and Reflections, adapted to the Comprehension of Young Persons.' The *Family Magazine* was carried on for some time by Mrs. Trimmer, and the principal original papers were afterwards published as 'Instructive Tales.' Among her subsequent publications were 'Pictorial Illustrations of Sacred History,' &c., and a periodical called the *Guardian of Education*, which extended to 5 vols. Her last work was a volume of selected 'Family Sermons.' She died, December 15,

1810. In 1814 appeared, in two octavo volumes, an 'Account of the Life and Writings of Mrs. Trimmer.'

TRINCOMALEE, a fortified town and magnificent harbour on the east coast of the island of Ceylon, in 8° 32′ N. lat., and 81° 14′ E. long., is situated in the N.E. corner of a great inlet called Trincomalee Bay. The harbour, which for accommodation and safety is perhaps not surpassed by any in the world, is invaluable to the British as a naval station in the Indian seas. It has room enough for whole fleets; is landlocked by high ridges, and sheltered from all winds; has depth of water for the largest ships; and, what is of most importance, can be entered at all seasons during both monsoons. A ship from Madras can reach it in two days. The town is at the base of a rock, crowned by Fort Frederick, and contains barracks for European troops, but the station is unhealthy.

The inhabitants, who are not numerous, are chiefly Hindus from Tanjore and the adjacent coast of Hindustan, with a few natives of Ceylon, and the British troops stationed there. The climate is hot; the mean temperature of the coolest months, when the N.E. monsoon prevails (April to October), is about 77°; the mean of the hottest, when the land-wind, or S.W. monsoon, blows, is about 83°. There is little export trade, the produce being hardly enough for the wants of the inhabitants, though the adjacent country was once populous, and exported grain and other provisions to the coast of Hindustan. Many reservoirs and other works for irrigation and drainage are now in ruins and choked up; and swamps, jungles, and woods, abounding with wild hogs, buffaloes, and elephants, fill the atmosphere with malaria, and render the climate more unwholesome than the greater part of the rest of the island.

The fortifications extend for a mile along the shore. Fort Frederick is a station for four companies of a European regiment, a company of royal engineers and artillery, and detachments of the Ceylon rifle corps. Fort Ostenberg, about 3 miles south-west of Trincomalee, commands the entrance of the harbour and the dockyard. The defences were mostly constructed by the Portuguese, who held the town from 1620 to 1658, when it was taken by the Dutch. In 1782 it came into the possession of the English, but was taken by the French, and restored to the Dutch in the following year, and they retained it until the capture of Ceylon by the British in 1795, when it was surrendered after a siege of three weeks.

TRING. [HERTFORDSHIRE.]

TRINGA. [TRINGINÆ.]

TRINGI'NÆ. In the article SCOLOPACIDÆ will be found some general views as to the place of the Sandpipers (*Tringa*, Linn.), many of which are arranged within the sub-family *Totaninæ*. Here it remains for us to notice a few examples of the genus *Tringa* of authors (including the sub-genera *Pelidna* and *Calidris*, Cuv.), as separated from *Totanus*, *Machetes*, *Strepsilas*, *Vanellus*, &c., which constitute the Linnæan genus *Tringa*. [PLOVERS.]

Selby, in his genus *Tringa*, includes the Pigmy Curlew of Pennant (*Numenius pygmæus* or *subarquatus*), a bird which, Mr. Yarrell observes, constitutes a link between the true Snipes and the true Sandpipers, or Marine Snipes, most of which frequent and obtain their living on the sandy shores of the sea. Excluding this species, Selby's British Tringæ consist of the following species: the Knot (*Tringa canutus*; *Calidris canutus*, Cuv.), the Buff-breasted Tringa (*Tr. rufescens*, Vieill.), Temminck's *Tringa* (*Tr. Temminckii*, Leisler), the Minute Tringa (*Tr. minuta*, Leisler), the Rock Tringa, or Purple Sandpiper, (*Tr. maritima*, Brunich), and the Dunlin or Purre (*T. variabilis*, Meyer). These all inhabit 'marine marshes and shores, though some habitually frequent the margins of lakes and the rivers of the interior. They associate and live in flocks, and perform their periodical migrations in large bodies. Their moult is double, that is, the plumage is renewed twice in the year; and the summer or nuptial livery is very different from that in which they are clothed during the rest of the year. The principal variations of colour are from white to reddish brown, and from gray to black.' These frequent and peculiar changes, as in other genera of the *Scolopacidæ*, have led to great confusion, and the false multiplication of species. As examples, we select the Knot, and the Little Sandpiper.

The Knot is the *Tringa cinerea*, *grisea*, and *canutus* of Linnæus and Gmelin; *Calidris canutus* of Cuvier; the *Maubèche grise*, *Maubèche tachetée*, and *Le Canut* of the French; *Chiurlo*, *Piovanello maggiore*, and *Paginella maggiore* of the Italians; *Rothbraune Strandlaufer*, *Aschgraus Strandlaufer*, and *Hochköpfige Strandlaufer* of the Germans.

Several other scientific names have been given to the bird according to the different stages of its plumage, such stages having been mistaken by the describers for specific differences.

Geographical Distribution. — Iceland, Greenland, North Georgian Islands, Duke of York's Bay, Melville Peninsula (where they were seen breeding), Hudson's Bay (where they breed), and down to the fifty-fifth parallel, Sweden and Norway, Holland in spring and autumn, the British Islands (but not known to breed there), rare in Germany, France, and the south of Europe.

Nest, Habits, Food, &c.—The Knot lays four eggs on a tuft of withered grass, without forming any nest. The eggs are of a light yellowish brown, spotted with gray and reddish at the larger end, so as to form a sort of zone more or less: there are but few spots towards the point. In the autumn the Knots appear on the eastern coasts of England in great numbers, and are to be found also in most of the southern counties. They are regular visitors to Ireland.

Their food consists principally of worms, and also, occasionally, of small river and marsh insects, little marine crustaceans, and very small bivalve molluscs.

Utility to Man.—One of the most delicious of birds, and, when fattened, preferred by epicures to the luscious ruff. 'They are taken,' says Pennant, 'in great numbers on the coast of Lincolnshire, in nets such as are employed in taking ruffs. With two or three dozen of *stales* of wood painted like the birds, placed within, fourteen dozen have been taken at once. Their season is from the beginning of August to the end of November. They disappear with the first frosts. Camden says they derive their name from King Canute, Knut, or Knout, as he is sometimes called.

The *Little Sandpiper*.—This, which is the smallest British Sandpiper, with one exception (Temminck's Tringa), is the *Tringa minuta* of Leisler, the *Tringa pusilla* of Linnæus, Latham, and Pennant, the *Stint* of Bewick, the *Tringa minuta* of Fleming, the *Minute Tringa* of Selby, the *Little Stint* of Jenyns, and the *Pigmy Sandpiper* of Richardson. It is the *Gambecchio* and *Culetto* of the Italians; *Der Hochbeinige Strandlaufer* and *Der Kleine Schlammlaufer* and *Zwerg Schlammlaufer* of the Germans.

This species is migratory; it breeds in the high

northern latitudes, whence on the approach of winter it migrates southward, and is found throughout Europe and Asia generally, and some parts of Africa, frequenting the banks of lakes, large rivers, and salt marshes, as well as the flat sea-coast. In general habits and manners it may be compared to the Knot. Of its nidification nothing is known. Its eggs resemble those of the Common Sandpiper, except in being much smaller.

TRINIDAD, an island in the West Indies, belonging to England, is situated between 10° 5′ and 10° 50′ N. lat. and 61° and 62° W. long. It is the most southerly of the West India islands, and is separated from South America by the Gulf of Paria, which forms an immense harbour with good anchorage. Trinidad is about 50 miles long from south to north, from 30 to 35 broad, and contains 1754 square miles. It is the largest and most valuable of the West India islands, except Jamaica. The western coast is low, and either sandy or swampy, but the three other sides are rocky and elevated. A chain of mountains, which occupies a breadth of about 10 miles, and whose highest points vary from 1800 to 3000 feet, runs along the northern side, close to the sea. Southward of them is a plain, then occurs a range of hills, then another plain, and lastly, another chain of hills near the south coast. The whole island is well watered by streams in every direction. The mountains on the N. are clothed with stately forests, and their margins fringed with overhanging mangroves, dipping into the sea. Trinidad is not visited by hurricanes. The climate is apparently less unhealthy than that of many of the other West Indian islands, and is not subject to droughts. The beneficial and abundant dews, arising from the numerous rivers of the island and the surrounding ocean, cool and invigorate the atmosphere, and give an unusual luxuriance to the vegetation. The average annual rain-fall is about 75 inches. There are several active mud volcanoes, which throw mud to a height of 30 feet, and occasionally emit flames. The most remarkable natural feature is the Pitch Lake, about a mile and a half in circumference. The pitch at the sides is perfectly hard and cold, but as one walks towards the middle with the shoes off, in order to wade through the water, the heat gradually increases, the pitch becomes softer and softer, and the impression of the feet is left upon its surface. At last it is seen boiling up in a liquid state, and the air is there strongly impregnated with bitumen and sulphur. During the rainy season it is possible to walk over nearly the whole lake, but in the hot season a great part cannot be approached.

Trinidad possesses some excellent harbours, such as Chaguaramas, Guaya-guayara, and Puerta d'España. On the last named stands the town called the Port of Spain, the capital of the island. All the usual productions of tropical countries grow luxuriantly: the most important being cocoa, arrow-root, cocoa-nuts, sugar, nutmeg, and cinnamon. Rum is manufactured in considerable quantities. Before 1783 the commerce was very trifling, and the first sugar plantation was not established till 1787. In 1865 the exports of all kinds were valued at 820,109*l.*, and the imports at 810,347*l.* The chief trade is with Great Britain, the United States, and the neighbouring islands. The imports into the United Kingdom from Trinidad in 1865 were valued at 877,097*l.*—on leaving the island for this country they were only valued at 637,816*l.*—the two chief articles being cocoa (3,210,463 lbs., value 109,662*l.*) and unrefined sugar (555,835 cwts., value 598,411*l.*). The exports from the United Kingdom to Trinidad in the same year were valued at 402,517*l.*, and consist principally of cotton and iron manufactures, flour, casks, staves, and hoops. The revenue and expenditure of the colony are each rather over 200,000*l.* a year. There is a public debt of about 190,000*l.*

The slaves in the island in 1834 numbered 20,6 and their owners received the sum of 1,033,992*l.*, rather more than 50*l.* a head, as compensation, when slavery was abolished. The number of free blacks whites at the same time was 18,724—making the to population 39,381: in 1865 it had increased to 86,0 occasioned chiefly by voluntary emigration from neighbouring colonies, and of labourers from India.

Trinidad is under the administration of a gover and council, acting under the orders of the Engl cabinet. The governor's official salary is 3500*l.* a ye The legislative council consists of twelve members, six whom are appointed by the crown, and six elected the people at large: all are removable at the pleasure the sovereign. The laws are a mixture of those England and Spain. Education is well attended to.

Trinidad was discovered by Columbus in 1498, wh it contained a numerous aboriginal population. It w first colonized in 1588, by the Spaniards; in 1676 was captured by the French, but almost immediate restored, and in 1797 it was taken by the British un Abercrombie, and has since remained in their possessi *Port of Spain*, the capital of the island, on its W. coa is one of the finest towns in the West Indies, and co tains a population of about 19,000. The houses built of stone or brick, and on a regular plan: wood ones are not allowed to be erected. The streets long, wide, well-paved, clean, and shaded with tre There are Protestant and Roman Catholic church several chapels, and numerous schools, which are w attended. The harbour is good, and the town is t chief seat of the commerce of the colony. The scene in the vicinity is very fine. *San Fernando* is the se other town in the island, but there are several ve pretty villages.

TRINITY (Greek, τριὰς; Latin, *trinitas* or *tri unitas*) is a word used by theologians to describe t Divine Being as consisting of three persons united one God. The statement given of the doctrine of t Trinity in the so-called Athanasian creed is that usua adopted by Evangelical divines—'We worship one G in Trinity and Trinity in Unity; neither confoundi the persons nor dividing the substance. For there one person of the Father, another of the Son, a another of the Holy Ghost. But the Godhead of t Father, of the Son, and of the Holy Ghost is all on the glory equal, the majesty co-eternal.'

On the Scriptural View of the Trinity.—The diff ence between those who receive the doctrine and th who reject it of course resolves itself into a number questions in biblical criticism. Referring to the arti UNITARIAN for the opinions of the latter party, proceed to state the views generally held by the form of the scriptural statements concerning the Trinity.

In the Old Testament this doctrine cannot be said hold a prominent place. The great doctrine they taught is the unity of God as opposed to polytheis This point having been clearly revealed in the books the Old Testament, and having been practically incu cated in the history of the people of Israel, a furth revelation of the nature of God was made by Chr tianity, namely, that in this one only God were myst riously united three distinct persons, each of them divi But yet there are passages of the Old Testament

which this doctrine is either revealed or incidentally implied, such as Isa. lxiii. 9, 10; xlviii. 16; xxxiv. 16.

The scriptural argument for the Trinity may be stated in the following manner:—Besides the many passages of the New Testament in which one supreme being (God) is mentioned, there are many others in which mention is made of the Father, the Son, and the Holy Spirit, or the Spirit of God, whose distinct personality is clear from the manner in which they are spoken of. To these three persons divine attributes are ascribed where they are mentioned together, and also to each of them singly. Hence the scriptural proof of the doctrine of the Trinity is twofold: being derived, first, from passages in which the Father, Son, and Holy Spirit are mentioned together as God; and secondly, from passages which prove each of them to be divine. Of the former class of passages, two of the most remarkable are Matt. xxviii. 19; 2 Cor. xiii. 13. In the former of these we have the commission of Christ to his Apostles, and the baptismal formula, by which they were to admit men to the fellowship of his church. The apostles were sent to teach all nations to turn from their vanities to the living God, and so to be baptized in the name of the Father, and of the Son, and of the Holy Ghost. But unless they come to worship and serve the three as the only living and true God, the language of this commission and rite was directly fitted to promote creature-worship, which all must admit the Christian religion strongly and explicitly condemns. The nations were to be baptized in the *same manner*, and therefore doubtless in the *same sense*. Whatever honour, or worship, or obedience, is given to the first person named in the solemn rite, the same is to be given to the other two. They equally with him are acknowledged as the object of reverence, worship, and service. In 2 Cor. xiii. 14, we have the apostolical form of benediction:—'The grace of our LORD JESUS CHRIST, and the love of GOD, and the communion of the HOLY GHOST be with you all.' It is impossible to believe that St. Paul, or any other sane man, would in the same sentence, and in the same solemn manner, recommend his Corinthian converts to the love of the Great God, and the grace and communion of two created beings. To these direct statements may be added a great part of the 14th, 15th, and 16th chapters of John's gospel, and several other passages in the gospels, and also 1 Cor. xii. 3–6; Titus iii. 4–6; 1 Pet. i. 2, 3. A striking declaration of the same truth is generally thought to be set forth in the circumstances which attended the baptism of Christ (Matt. iii. 16–17; Luke iii. 21, 22; John i. 32–34). The passage in 1 John v. 7, 8, is now pronounced to be spurious by the almost universal consent of biblical scholars.

Besides this general assertion of the union of the Father, the Son, and the Holy Ghost, in the Godhead, the following passages are produced to prove separately the personality and the divinity of the Father: John i. 14, 18; v. 17, 18; xvi. 26, &c.; Heb. i. 2–5; Rom. xv. 6; 1 Cor. i. 3; Ephes. iii. 14; and the following, in which 'the Father' is also expressly called 'God:' John vi. 44–46; xx. 17; Ephes. i. 17; 1 Pet. i. 2; Rev. i. 6. In all these passages the word *Father* is used with reference to the relation of the Father to the Son. Those passages in which God is called *the Father*, in reference to created beings, are scarcely in point here.

The personality and Godhead of the Son are proved by the assertions of Christ respecting his own nature, whether he is speaking of himself directly, or under the names of 'Son of God' and 'Son of Man,' and by the similar statements of the sacred writers. Thus his person is described as consisting of two parts, the one human, and the other superhuman (John iii. 11, 13; vi. and viii., passim; and compare John i. 15, 30; iii. 31, &c.; 1 Cor. xv. 47–49; Rom. i. 3; ix. 5; 1 Tim. iii. 16; Heb. ii. 17). He is declared to possess an eternal existence (John i. 1–3; xvii. 5, 24; 1 John i. 2, 5, 20; Heb. i. 10–12; Rev. xxii. 13). To him are ascribed the divine attributes of Omnipotence (John v. 19; x. 18; xiv. 13; Matt. xi. 27; xxviii. 18; Luke xxi. 15; Rom xv. 18; 2 Cor. xii. 9; Phil. iii. 21; 1 Pet. iii. 22; 2 Pet. i. 3), and Omniscience (Matt. xi. 27; John vi. 46; xiv. 13, 14; Acts i. 24; 1 Cor. iv. 5), and Omnipresence (Matt. xviii. 20, and xxviii. 20). His nature is expressly said to be divine, equal to, and one with God. (John v. 18, 26; x. 28; Phil. ii. 6; Col. ii. 9.) In his person God is declared to be clearly seen (John xiv. 9), so that he is called the 'image' (εἰκὼν) of God (Col. i. 15; 2 Cor. iv. 4), the 'splendour of his glory, and the exact counterpart of his person.' (Heb. i. 3.) Works are ascribed to him which can only be performed by a divine being: such as the creating, upholding, and governing of the world (John i. 3, 10; Col. i. 16, &c.; 1 Cor. viii. 6; Heb. i. 2, 3, 10; Matt. xi. 27, 28; xviii. 20; Mark xvi. 19; John xvii. 2), the resurrection of the dead, and the last judgment (John v. 21, &c.; Matt. vii. 22, &c.; x. 32; xxv. 31, &c.; Phil. iii. 20). Titles are given and worship paid to him, such as belong to God alone. (1 Cor. ii. 8; Rom. xiv. 9; Phil. ii. 10; 1 Pet. iii. 22; Rev. xvii. 14; xix. 16; John v. 23; Matt. xxviii. 19; Phil. ii. 10; Heb. i. 6; Rev. v. 13; Acts i. 24; vii. 59; Rom. ix. 1; x. 12; 1 Cor. i. 2; 2 Cor. xii. 8; Heb. iv. 16; Rev. v. 8–14; vii. 12.) His nature is as unsearchable to man as that of the Father. (Matt. xi. 27; Luke x. 22; John x. 15.) Lastly, he is expressly called God (John i. 1; xx. 28; Rom. ix. 5; Tit. ii. 13; Luke i. 16, 17; Acts xx. 28; 1 Tim. iii. 16; Heb. i. 8; Rev. i. 8; xxii. 6).

The argument for the personality and divinity of the Holy Spirit is of a similar character, and rests chiefly on the following passages:—Rom. viii. 26, &c.; Eph. iv. 30; 1 Cor. xii. 8, &c.; 1 Pet. i. 10, &c.; 2 Pet. i. 21; John iii. 3; Rom. viii. 14; 1 Cor. ii. 12; iii. 16; vi. 11, 19; 2 Cor. i. 22; Ephes. i. 13, &c.; iv. 6, 30; Gal. iii. 14, 26; v. 18, 22; 2 Tim. i. 7; Acts xx. 28; 1 Pet. i. 12; 1 Cor. ii. 10; John xvi. 7–13; Acts v. 3, 4; 1 Cor. vi. 19; 2 Cor. vi. 16.

Though the Scriptures furnish us with no systematic account of the relations which the three persons of the Trinity respectively sustain to each other and to created beings, yet they contain statements and illustrations which must form the basis of every attempt to explain this most difficult subject. Thus, besides the relations implied in the names Father, Son or Word, Spirit of God or Holy Spirit, we are expressly informed respecting the Father, that he is the source of all being and life (1 Cor. viii. 6); that he is invisible and incomprehensible, except as revealed by and through the Son (John i. 18; vi. 46; comp. 1 John iv. 12; 1 Tim. vi. 16); that his very essence is love, and that his love is manifested to men in the incarnation of the Son (John iii. 16-17; 1 John iv. 8, 16). Every visible and sensible revelation of the Godhead to created beings has been made from all eternity through the Son, who is called the first and only begotten, the Son of the Father's love, and in whom the whole fulness of the Godhead is said to be contained. (Col. i. 13; John iii. 16; x. 36; Rom. viii. 32; Ephes. i. 6; Mark xii.

6; xiv. 61; 1 John iv. 15; v. 9–12; Col. ii. 9; and several other passages.) The Holy Spirit is said to be sent forth by or to proceed from the Father and the Son, and to honour the Son and reveal him to men. (John xvi.; 1 Cor. xii. 3; and other passages.)

The fact deserves especial notice, that in the biblical statement of this doctrine no attempt is made to reveal to us what constitutes the substance or essence of the Divine Being, or what is the mode in which three distinct persons are united in that substance. But little reflection is necessary to see the reason of this: we could not have understood such an explanation had it been made, even if human language could have furnished the means of expressing it, which is more than doubtful.

Some theologians have asserted that the distinction of Father, Son, and Holy Ghost is not essential, but merely modal, or economical, and that it simply brings before us the fact that God manifests himself in three different relations to mankind. The oldest form of this heresy is called Sabellianism, from its founder Sabellius, a presbyter of Ptolemais (about 250). He maintained 'that the appellations Father, Son, and Holy Spirit are so many different manifestations, or names of one and the same divine being. He thus converted the real distinction of persons (the Trinity of essence) into a distinction of mere modes (the Trinity of manifestations).'

(Hagenbach's *History of Doctrines*, vol. i.; Neander's *Church History*, vol. ii.; Dorner, *On the Person of Christ*; Bretschneider's *Handbook of Dogmatics*; Dr. Pye Smith's *Scripture Testimony to the Messiah*, vol. ii.; and Wardlaw's *Discourses on the Socinian Controversy*.)

TRINITY COLLEGE, CAMBRIDGE. Two colleges formerly existed upon the site of Trinity College: the one named Michael House, dedicated to Michael the Archangel, was founded in 1324 by Harvey de Stanton, chancellor of the exchequer to King Edward II.; the other was King's Hall, founded in 1337 by Edward III. Both were resigned into the king's hands in 1546 by the respective masters, and their lands in the same year made part of the endowment of a new college founded by Henry VIII., under the name of Trinity College. The king appointed his college to consist of a master and sixty fellows. Queen Mary increased the endowment, for the maintenance of twenty scholars, ten choristers and their master, four chaplains, thirteen poor scholars, and two sizars. Several other scholarships have been added; the present number is seventy-two. There are sixteen sizars upon the foundation, who are entitled to commons and other allowances to the value of about 40*l.* per annum each.

The government of the college is vested in the master, who is appointed by the crown, and the eight senior fellows. The fellows are elected from members who have attained the degree of Bachelor of Arts, and whose standing after such degree does not exceed three years. There is no appropriation whatsoever, and all are required to take holy orders within seven years after attaining the standing of Masters of Arts, with certain exceptions defined by the commissioners appointed under the Act of Parliament, 19 & 20 Vict. c. 88. The scholarships are open to all students of the college, without any appropriation. There are many exhibitions, and numerous annual prizes are distributed, chiefly for literary competitions.

Trinity College is situated between St. John's College and Caius College, occupying the space between Trumpington Street and the river Cam. It consists of three courts of unequal dimensions. The outer and largest is entered from Trumpington Street by a turreted gateway, said to have been formerly the entrance to King's Hall; and the inner one is called Neville's Court, from Thomas Neville, master of the college and dean of Canterbury, by whose benefaction the principal part of it was built. The library, which now forms the west side, is of later date, and was designed by Sir Christopher Wren. A third court, adjoining Neville's, was completed in 1825, and another was built by the late eminent master, William Whewell, who also bequeathed his large fortune for the purpose of building a fifth, and founding a professorship of international law. The chapel was begun by Queen Mary, and finished by Elizabeth. In the ante-chapel is a statue of Sir Isaac Newton, by Roubiliac, which is considered to be one of the finest produced in modern times. The hall, which is about 100 feet in length, is in the mixed style of architecture which began in the reign of Henry VIII. The Master's Lodge, which contains several spacious apartments, has always, since the time of Queen Elizabeth, been the residence of the king when the university has been honoured with a royal visit; and the judges always lodge there during the assizes. (*Cambridge University Calendar*, 1868.)

TRINITY COLLEGE, OXFORD. This college was originally founded and endowed by Edward III., Richard II., and the priors and bishops of Durham. As it was under the patronage of the latter, it obtained the name of Durham College, though dedicated from the beginning to the Holy Trinity, St. Mary, and St. Cuthbert. At the Reformation it was suppressed. Sir Thomas Pope, Knight, of Tittenhanger, in Hertfordshire, February 20, 1554–55, purchased the site and buildings, and founded the present college, dedicated to the 'holy and undivided Trinity,' for a president, twelve fellows, and twelve scholars.

The founder directs that the scholars shall be chosen from his manors; but if no such candidates properly qualified appear on the day of election (Trinity Monday) that then they shall be supplied from any county in England. Under the new statutes, the fellowships and scholarships are entirely open. The value of the latter is 80*l.* a year.

There is also a scholarship, nearly coeval with Sir Thomas Pope's foundation, founded by Richard Blount, Esq., of the city of London, and there are three exhibitions.

The original buildings of this college were those which belonged to Durham College, and were repaired by Sir Thomas Pope for the use of his society. During the great rebellion they became ruinous; and in 1664 Dr. Bathurst, then president, began to repair the quadrangle, which he completed in 1667, at his own expense. Soon after a new court of three sides was projected in the Fellows' Garden, and was completed in 1728. Sir Christopher Wren was the architect employed on it. The hall, on the west side of the quadrangle, having fallen into decay, was rebuilt in 1618. The library, though it has undergone various changes, is in substance the oldest part of the college, having been erected in 1617. The present chapel, originally that of Durham College, was erected between 1681 and 1694. (*Oxford University Calendar*, 1868.)

TRINITY HALL, CAMBRIDGE, was founded in 1350, by William Bateman, bishop of Norwich. The college continued to be governed by the statutes of its founder until the year 1860, when new ones were enacted. There are thirteen foundation fellowships. All the fellows have the same stipends and privileges, and they and the master constitute the governing body

of the college. Of the fellowships ten are accounted lay fellowships, and are designed for persons intending to pursue the legal profession as barristers or advocates at the Scotch bar, and three are clerical fellowships, for persons who may be engaged in the tuition of the college. The holders of the latter are required to be in holy orders within twelve months from their election. Lay fellowships are tenable for ten years from the time of attaining the standing requisite for taking the degree of M.A. or LL.D., but in the case of a person not elected a fellow until he be past this standing, his fellowship is tenable for ten years from the date of his election. The holding of certain college offices prolongs the tenure of the fellowships. Lay fellowships are not vacated by marriage.

The clerical fellowships are tenable for life, but are vacated by marriage, excepting in certain cases in which the governing body can by special vote permit a college tutor, or a person who has been engaged in college tuition for fifteen years, to continue to hold his fellowship, although he is married.

The study of the law, for which this college was especially designed by the founder, has been provided for under the statutes of 1860, by the establishment of a law lectureship and three law studentships; the latter are tenable for three years, and are of the annual value of 50*l*. They are to be given to graduates of the college in arts or law, who intend to prepare themselves for practice in some branch of the legal profession. The holders of these studentships are not required to reside in the university. The college scholarships are tenable up to the time of taking the B.A. or LL.B. degree; they are at present sixteen in number, and are between 13*l*. and 60*l*. a year in value. The scholarships are awarded according to the results of the various college examinations in classics, mathematics, and law, which are held in the first and second years of residence. There are also two exhibitions of the values of 50*l*. and 60*l*. respectively, which are tenable during the first year of residence.

The college, which is situated near the river Cam, between Clare Hall and Gerrard-Hostel Lane, consists of a small neat court faced with stone. The old hall was demolished in 1742. (*Cambridge University Calendar*, 1868.)

TRINITY HOUSE, officially called 'The Corporation of the Elder Brethren of the Holy and Undivided Trinity,' a society which has the management of some of the most important interests of the seamen and shipping of England. The earlier records, together with the house of the corporation, were destroyed by fire in 1714. A society having been formed under the above name at Deptford, in 1518, by Sir Thomas Spert, knight, it received a charter of incorporation from Henry VIII., which is the earliest official document relating to the Trinity House now extant. The privileges of the corporation were confirmed in 1658, and in 1680 its first lighthouse was erected; all the lighthouses which had previously existed on the English coast having been built by private individuals under patents from the crown. By 6 & 7 Will. IV. c. 79, and the Merchant Shipping Act, 1854 (17 & 18 Vict. c. 104), private rights in light dues were abolished, and the exclusive right of lighting and buoying the coast vested in the Board of Trinity House. The same Act gave them a general supervision over the commissioners of Northern Lights; the Ballast Board of Dublin; and the corporations which have charge of the lighthouses and buoys of Scotland respectively, subject to an appeal to the Board of Trade, to whose general superintendence Trinity House is also subject in matters relating to England. The lighthouses of the Isle of Man are under the charge of the commissioners of Northern Lights.

The corporation consists of an indefinite number of members, of whom thirty-one are styled elder, and the remainder younger brethren. The master, who is generally a member of the royal family or a statesman of high rank, has associated with him ten noblemen or gentlemen who have (as a rule) been eminent in the great public departments of the state; the conduct of its active duties rests with twenty of the elder brethren, under the presidency of the deputy master, and these members complete the thirty-one elder brethren. The twenty acting brethren are officers of the mercantile marine and of her Majesty's navy, the latter being a small proportion of the whole number, and consisting at this time of two admirals and one captain of the royal service. The present master is H.R.H. the duke of Edinburgh, K.G., K.T., &c., and a captain in the royal navy. The deputy master and the acting elder brethren are really self-elected from a list of the properly qualified younger brethren; and the qualifications for this purpose are—that the candidate shall have attained the rank of commander in her Majesty's navy for at least four years previously, or shall have served as master in the merchant service, on foreign voyages, for that period. The younger brethren are chosen from members of the royal navy, or from the commercial marine, and are admitted at the pleasure of the court of elder brethren, upon the proposition of any of its members.

By the 16 & 17 Vict. c. 129, and the Merchant Shipping Act, 1854, the power to appoint and license pilots for the English coast was vested exclusively in the Corporation of the Trinity House; and the same Acts placed under their jurisdiction the Cinque Ports pilots, who had been formerly under the control of a separate society. The Trinity House formerly had the distribution of certain funds arising from light and pilotage dues, and from the sale of ballast; but the right which it possessed to the surplus of light dues was abolished by the Merchant Shipping Act.

The annual revenue of the corporation is very considerable, and is partly derived from tolls paid in respect of shipping, which receives benefits from the lights, beacons, and buoys, and from the ballast supplied.' The ballast is raised from such parts of the bed of the river as it is expedient to deepen, by machinery attached to vessels. The remainder of the revenue proceeds from lands, stock, &c., held by the corporation, partly by purchase, partly from legacies, &c., and donations of individuals. The whole is employed upon the necessary expenses of the corporation in constructing and maintaining their lighthouses and lights [LIGHTHOUSES], beacons and buoys, and the buildings and vessels belonging to them [BEACONS; BUOYS]; in paying the necessary officers of their several establishments, and in providing relief for decayed seamen and ballastmen, their widows, &c. The present house of the corporation is on Tower Hill. Neither the honorary members nor the younger brethren derive any pecuniary advantage from their connection with the corporation. Two of the elder brethren sit as assistants to the judge in the Court of Admiralty in almost all cases where any question upon navigation is likely to arise. The various duties of the corporation are parcelled out among the wardens and different committees appointed for the purpose of discharging the same. The deputy master and elder brethren are employed on voyages of inspection

of their lighthouses and lights, beacons and buoys, not unfrequently in most trying weather and seasons; and they are also often engaged in making surveys, &c., on the coast, and reports on such matters of a maritime character as are referred to them by the government.

The Trinity House has at present on the coasts of England and Wales seventy-nine lighthouses, thirty-eight light-vessels, and about 500 buoys and beacons; and employs about 850 persons in their management. There are also in Scotland fifty-eight lighthouses, 112 buoys, and forty-two beacons; and in Ireland seventy-two lighthouses, five light-vessels, and seventy-seven buoys and sixty-three beacons.

TRINITY SUNDAY, the Sunday immediately following Whit or Pentecost Sunday, and so called because appropriated to special services in honour of the Blessed Trinity. The feast was not known to the early fathers of the Christian church, and though probably observed in some of the churches of the West as early as the ninth century, was not recognized throughout Christendom until established by a decree of Pope John XXIII. in 1334.

TRINOMIAL, the algebraical name for an expression which consists of three terms, as $a + b + c$, or $ax - bx^3 + bx^4$.

TRIO, in Music, a composition intended for performance by three voices or three instruments. The same term is also applied to a movement in three-quarter time in a different key, following the leading movement of a musical composition, and gradually returning into the original key.

TRIO'DIA, the name of a genus of plants belonging to the natural order *Graminaceæ*. The species of this genus of plants are principally natives of New Holland; one only is a native of Europe, and is also found in great abundance in Britain. *T. decumbens*, Decumbent Heath-grass, is an abundant plant on wet mountain pastures, and on heaths and moors. It is about a foot high, and is one of those grasses which will grow abundantly on poor wet soils. Animals, however, do not appear partial to it.

TRIOLET, in Poetry, a stanza of eight lines, in which the first line is thrice repeated.

TRIONY'CIDÆ (Gr. τρεις, 'three,' and ὀνυξ, 'a claw'), a family of Tortoises, of which the genus *Trionyx* is the type. It consists of two genera, the *Trionyx* and the *Emyda*. It is characterized by palmated feet, and three claws on each foot. The carapace, or shell, is covered with a soft skin, which is expanded before the eye; and hence the family have received the designation of Soft Tortoises.

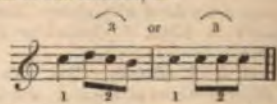
TRIPE DE ROCHE, a name originally bestowed by the Canadian *voyageurs*, or backwoodsmen, upon several species of *Gyrophora* and *Umbilicaria*. This 'rock tripe' furnishes but a coarse and unsatisfactory food, and its food properties, such as they are, are sadly deteriorated by the possession of a bitter principle which induces violent attacks of diarrhœa. Nevertheless it has been found of service by many of our Arctic explorers. It has a leafy, blistered-looking thallus, and the round shields, without stalks, are covered with a black membrane, variously marked with plaits and circles. It grows abundantly in the rocky districts of the north, and one species has been met with in the Himalaya at an altitude of upwards of 18,000 feet.

TRIPLE ALLIANCE is the name given to two important international treaties. In 1667 Louis XIV., king of France, took advantage of the decline of the Spanish monarchy about that period, and set up a claim to the Spanish Netherlands in right of his wife. He invaded the country with a powerful army and immediately captured Lisle, Courtray, and several other cities. In fact, it became at once evident that no force in the Netherlands was able to stop or retard the progress of the French arms; and under these circumstances Sir William Temple, the British minister at Brussels, urged upon his government the importance of forming a league with Holland in order to save the Netherlands, and they having agreed to the proposal he was commissioned to enter into a union with the minister of that country to check the ambitious designs of Louis. This agreement was afterwards joined by Sweden, and hence it is known by the name of the Triple Alliance of 1668. Louis was obliged to give way, and the plenipotentiaries of all the powers met shortly afterwards at Aix-la-Chapelle, where a treaty was concluded by which Spain resigned to France all the towns conquered by the French in the campaign, but was guaranteed in the possession of the rest of Flanders. The second Triple Alliance was concluded in 1717, between England, France, and Holland against Spain. It recognized the Hanoverian succession in England, and provided for the demolition of the fortifications of Dunkirk. Germany soon afterwards acceded to the new confederacy, and the Triple was merged into the Quadruple Alliance, which greatly crippled the power of Spain.

TRIPLE-TIME, in Music, a time consisting of three measures in a bar; the two first of which are beat with the falling of the hand or foot, and the third marked by its elevation. There were formerly in use no less than six different triple measures. But at the present time we only employ three different triples; those of three mimims, of three crotchets, and of three quavers.

TRIPLET, in Poetry, a succession of three lines with identical rhymes, as in the following:—

> 'Whoe'er she be,
> That not impossible she,
> That shall command my heart and me.'

In Music, the grouping together of three notes, which are played in the time of one; three quavers being thus made equal to one crotchet, as:

TRIPLICATE. In the common arithmetical sense, the triplicate of a given ratio is found by taking the cube of each of the terms of the ratio. Thus when we say that two similarly-formed solids, whose linear dimensions are as 4 to 7, are in the triplicate ratio of 4 to 7, it is meant that the bulks of those solids are in the ratio of $4 \times 4 \times 4$ to $7 \times 7 \times 7$, or of 64 to 343.

TRIPOD (τριπους), is any article of furniture resting upon three feet, whence the name is given to tables, chairs, movable altars, and other articles of the same kind. A chair or an altar of this kind must be understood when we read that the Pythia of Delphi gave her oracles from a tripod. We find also mention of tripods containing a certain measure of fluid (Hom., 'Iliad,' xxiii. 264), and in this case we have to understand a bowl resting upon a pedestal with three feet. The crater, or the vessel in which the wine was mixed with water at the banquets of the ancients, was very frequently of this description. It was generally of metal and often of exquisite workmanship.

Tripods were the most common presents to the temples of Apollo, were given to the victors in the games

hich were celebrated in honour of Apollo, and appear
n innumerable coins which have any relation to the
orship of that god. Some ancient specimens are pre-
rved in the British Museum.

TRIPOLI is a country in Northern Africa, which
xtends along the southern shores of the Mediterranean,
om 11° to 25° E. long. On all other sides it is sur-
ounded by countries which form portions of the Sahara,
r Great Desert, or are unfit for cultivation. The width
om north to south cannot be definitely stated. The
rea is roughly estimated at 200,000 square miles, and
he population at 1,500,000.

West of the town of Tripoli the coast is low and
andy, and contains no harbour except that of Old
Tripoli, which is almost choked up with sand. Tripoli
self has a good harbour. The low and sandy coast
ontinues eastward of the town as far as Cape Sciarra,
nd contains no harbour. Beyond, the shore is higher,
nd consists of rocky points and capes, with sandy bays
etween them, a few of which afford shelter for small
essels. The Gulf of Sidra (anciently the Greater Syrtis)
ccurs about the middle of the coast line; it is 280 miles
ide, and its greatest extent inland is about 120 miles.
engazi, which is situated at its eastern entrance, has
safe port, which, however, is fast filling up with sand.
he coast from Bengazi eastward to the limits of the
erritory is at first for the most part low and sandy, but
rther on it becomes high and rocky. It contains the
ays of Ptolemeta, Susa Hammám (near which are the
ins of the ancient town of Apollonia), Hilal, Derna,
nd Bombah.

The coast-line of Tripoli exceeds 1000 miles, but
ntains only two or three harbours in which vessels
f moderate size can find tolerable shelter. There is
erhaps no other coast-line on the globe of equal extent
hich is so little favourable for commerce.

Physical Aspect.—We are very imperfectly acquainted
ith the interior of this country. Two ranges of moun-
ins traverse the western part, from W.N.W. to E.S.E.,
unning nearly parallel to the sea. The northern, called
he Gharian mountains, is visible from the sea, being only
5 to 20 miles inland. The southern range, 30 miles
rther to the south, is called the Sudah mountains. Some
eaks of the Gharian chain attain an elevation of 4000
et. Several minor ridges branch off from the eastern
ortion of this range on its northern side, and approach
lose to the Mediterranean between Cape Sciarra and the
ins of the town of Lebda. Much corn and fruit are pro-
uced among these mountains; but a considerable portion
f the tract is used as pasture grounds. The inhabitants
ere live mostly under ground, in caves which have been
ug for the purpose. A low table-land to the E. of the
harian mountains, in approaching the Gulf of Sidra,
plits into several short ranges of hills, which fill up the
pace between Cape Sciarra and the town of Mesurata,
nd in some places come close to the sea; many very
ertile spots are met with here. The country south of
his table-land, extending to the Sudah mountains,
ontains a much smaller portion of cultivated ground
han that north of it. Its surface presents a succession
f several wide depressions, running from west to east,
nd terminating on the east in the low grounds which
xtend along the shores of the Gulf of Sidra. From
ach of these wide valleys smaller ones branch off, and
enetrate a few miles into the higher grounds, which
nclose them. The habitable portion of this region is
ery limited, as in much of it sandy desolation reigns
upreme.

Near the western shore of the Gulf of Sidra is a marsh about 100 miles in length, forming the worst portion of the coast. A very sterile country also incloses the bottom of the gulf. The eastern side has a district of a more favourable character, which is called BARCA. It was known to the ancients as *Cyrenaica*, and comprehends the country which, between 20° and 23° E. long., projects into the Mediterranean nearly in the form of a semicircle, and the lands lying south of it as far as about 29° N. lat. The greater portion of it is mountainous. On the west, a range of mountains is separated from the shores of the Gulf of Sidra by a low plain, which is called the Plain of Bengazi, from the town of that name. It extends along the eastern shores of the Gulf of Sidra, from Braiga to Ptolemeta, a distance of about 180 miles in a straight line. Many portions of it are fertile. The mountain region of Barca is table-land, with a surface generally hilly, fertile in its western part, and somewhat sterile in its eastern. Three oases (Augila, Jalloo, and Leshkeneh) contain together about 10,000 inhabitants. There are three smaller oases between Augila and the southern extremity of the Gulf of Sidra.

Climate.—There are no rivers, but abundant rains fall from November to March, and are collected in numerous tanks and cisterns, to provide against the succeeding droughts which prevail throughout the remainder of the year, more especially from May to September, during which period sometimes not a single shower falls. At this time the heat is intense, the sirocco often blows, and the thermometer rises to 90° and 92°. During the rainy season the fluctuations of temperature are often very great, the thermometer frequently falling during the night to 40°, or to the freezing point, and rising during the day to above 70°. The prevailing winds of summer are E.; those of winter W. and N.W.

Natural Products.—Many of the fertile plateaux produce heavy crops of grain, especially where the dews are copious and the natural deficiency of moisture is supplied by irrigation from tanks, in which rain-water is collected for the purpose. On the sides of hills too steep to be arable, vines, olives, almonds, figs, and other fruits, are often seen growing in great profusion. By far the richest and most fertile tract of Tripoli is that of the Mesheea, which stretches about 15 miles along the coast, with a width not exceeding 5 miles, and has the capital nearly in its centre. The whole of this favoured district is occupied with fertile fields, on which rich crops of wheat, barley, millet, and Indian corn are grown; plantations of productive palm trees, arranged in regular rows; oliveyards, vineyards, orchards, and gardens yielding in abundance, among other fruits, oranges, pomegranates, lemons, figs, apricots, plums, and watermelons. The other principal products of the coast are cotton, silk, tobacco, saffron, madder, and castor oil; in the interior, senna, dates (which form the principal food of many of the inhabitants), and galls are the chief source of wealth, and the cassob and lotus are indigenous. The fertile region around the capital is inclosed by an immeasurable waste of sand, which forms a striking contrast to the cultivated fields, the edges of which it approaches. The wild trees and bushes are only used to make charcoal, and where this is not to be obtained, camel's dung is used for fuel.

Cattle are not numerous in Tripoli, except in Barca, where great numbers are reared on the table-lands, whence they are sent to Bengazi to be shipped to Malta and other places. The domestic animals are horses, mules, camels, sheep, goats, dogs, and poultry. The horses are of a fine breed, and the mules are strong and

excellent animals. The most common wild beasts of prey are wolves, foxes, hyænas, and jackals. There are antelopes, gazelles, and hares. Ostriches are only found in the deserts, especially south of the mountain region of Barca. Salt is collected at a few places, but no metals of importance appear to have been discovered, nor are there any but the rudest kind of manufactures.

Population.—The Arabs of Tripoli, who compose the bulk of the people, are the same stock as the Bedouins of Arabia. There are two tribes or bodies; one wanderers, and the other fixed residents in villages and small towns. Jews are numerous in the towns and in the villages. The Moors are either landed proprietors or merchants. As the latter they are mostly engaged in the cafilas which go to Fezzan and Bornou. They exactly resemble the Moors of Morocco. The number of Turks and Mamelukes has increased since the country has again become dependent on Constantinople, but they are generally either officers of government or serve as soldiers. Christians are only found in the town of Tripoli, where they are better treated than in any other place in the Turkish dominions. The character of the natives appears to be very indifferent. Drunkenness is very general, and M. Blaquiere, a French traveller, says he was unable to discover any good qualities to be contrasted with the attributes of revenge, avarice, treachery, and deceit, which predominate alike in prince and peasant. Nevertheless, such is the promptitude with which justice is administered that crimes are very rare, and the people are more civilized than in most parts of Barbary. In a recent report from the British consul, he says: 'Owing to the valuable properties of the soil, and the quick succession of crops, there is no country more gifted by nature than Tripoli; but, from the heavy taxation levied by the governors of districts, and the inert laziness of the inhabitants, who generally live from hand to mouth, due advantage is not derived therefrom; and large tracts of land which were designated by the name of the Granary of Carthage by the ancients, on account of the abundant yield of grain derived therefrom, are now a wild and abandoned waste.'

The pashalic of Tripoli, like that of the other Barbary states, is a despotism; and is ruled chiefly for the purpose of exacting a revenue, with little regard to the prosperity of the people. The country is divided into four livas or provinces—Tripoli, Bengazi, Mesurata, and Ghadames. The government claim as tribute a tenth of all the products of the soil, besides which, every fruit tree and head of cattle is taxed. In fact, the system throughout is one of extortion, and as in almost every other part of the Turkish empire, every principle of wisdom and justice is set at defiance in the matter of taxation.

History.—The history of Tripoli presents few incidents of importance. Under the Romans it formed a portion of the province of Africa, with the name of *Regio Syrtica*. Early in the third century it was known as the *Regio Tripolitana* (whence its present name), on account of a league consolidated by its three principal cities, Œa, Sabrata, and Leptis. Of the latter the Emperor Septimius Severus was a native, and in memory of his birthplace he elevated the 'regio' to the rank of a separate province. In the fifth century it passed, with the rest of Barbary, under the dominion of Genseric and the Vandals, and the seat of the new empire was placed at Carthage. Genseric, in 477, was succeeded by his son Hunneric, chiefly remembered for his cruelty towards the Christians. Then followed Gutamund, Thrasamund, and Hilderic, the latter of whom was deposed by the tyrant Gelimer. In his reign the Emperor Justinian projected an invasion of Africa, and the Vandal power in Barbary was finally overthrown.

The Romans retained possession of their conquest until the rise of the Arabs under their caliph Omar, when the whole of its inhabitants were forcibly converted to Mohammedanism.

About 1552 the Turks under Hayradin, brother of the celebrated Aineh Barbarossa, made themselves masters of the province. Tripoli was placed under the control of a dey, who, as the Ottoman power gradually declined, became virtually independent, and at length ceased to acknowledge the sultan's supremacy. In 1835 the Porte resolved to re-establish its sovereignty in this fertile province, and despatched an expedition against Karamanli, the ruling prince, who was defeated and thrown into prison. Since that event Tripoli has formed an eyalet of the Turkish empire, administered by a pasha who enjoys vice-regal rank. The inhabitants have made several attempts to throw off the yoke imposed upon them, but each insurrection has been easily suppressed.

Antiquities.—Most of the towns in the regency possess interesting remains, which are as yet but imperfectly known, particularly in the Pentápolis, where innumerable chambers are hewn out of the rocky hills throughout; some of them with architectural elevations, sculpture, and inscriptions. The ruins of temples, theatres, and aqueducts of Roman construction are particularly traceable at Ghrenna (Cyréne), Tauchira (Arsinoë), Ptolemeta (Ptolemais), and Marsa Susa (Apollonia). Lebda (Leptis Magna) has been spoiled of a vast number of its antiquities. At Tripoli Vecchia there is an amphitheatre of Roman construction still entire, 148 feet in diameter, with five degrees of seats; and in the same direction still exists the remnant of one of the great Roman ways, on the borders of which are observable the ruins of ancient buildings in stone.

TRIPOLI, the capital of the above state, and the residence of the pasha, is situated in 32° 53′ N. lat., and 13° 11′ E. long., 300 miles S. of Sicily. The town is built upon a rocky promontory washed by the sea on the N. and E., and connected with the mainland by a sandy plain—the part of which nearest the city, however, is under cultivation. It is defended by a castle, whose walls are unusually high, and which connects the line of batteries on the sea-front with a high wall that defends the town on the land side: the latter is strengthened by six bastions. The town has two gates; one towards the sea, and another opening to the south-east on the plain. It consists for the most part of narrow and uneven lanes, the houses in which are built of irregular stones and mud formed into a mass, and whitewashed. They seldom have an upper story, and an aperture is rarely seen in the exterior walls, the rooms being entered and lighted from a spacious square yard in the centre of the building. Tripoli contains six large and a number of smaller mosques. The Jews have their synagogues; and the Christians enjoy the free exercise of their religion. The bazaars are extensive. The shops (principally in the hands of the Jews) are miserable-looking hovels, though some of them contain articles of value, such as diamonds, pearls, gold ornaments, rich gems, and scarce drugs. The baths make a considerable show by their picturesque clusters of cupolas; some of them are chiefly of marble, and are crowded with bathers. The town also contains some very fine gardens. A kind of Italian is generally spoken by the inhabitants, and in that language Europeans may make themselves understood in transacting their affairs.

The population is about 20,000, of whom 3000 are Jews, residing in a suburb of their own. Outside of the town are the burying-places; the tombs are decent and numerous.

The harbour is formed by a long reef of rocks running out from the northern point of the town into the sea in a north-easterly direction, and by other reefs at some distance to the eastward of those, which together form a tolerably good shelter. It is the only good harbour along the coast for several hundred miles. The trade is carried on in small vessels, seldom larger than brigs. There is no direct commerce with England, but some indirectly through Malta. Marseilles, Leghorn, and the commercial towns of the Adriatic and the Levant, likewise have communications with Tripoli. The number of vessels which entered the port in 1866 was 195 (17,987 tons), and there cleared during the same period 192 (17,537 tons). The imports were valued at 67,450*l.*, and the exports at 66,800*l.* The trade of the town is extensive with the interior; and it slightly profits from the passage of pilgrims from Western Barbary on their way to Mecca. Formerly these caravans, composed partly of penitents and partly of traders, started from Fez, and passing through Tlemsen, Algiers, and Tunis, increasing as they went, on arriving under the walls of Tripoli, amounted sometimes to 3000 persons with their goods and merchandise, and half as many camels and horses. But the pilgrims now take a different route; and the caravans which stop at Tripoli in the present day seldom amount to more than a few hundred persons. The cafilas or small caravans from Fezzan and Ghadames, are now the principal medium of inland trade, which has, however, considerably fallen off of late years in consequence of the preference shown to other more convenient and economical routes. Tripoli has generally been chosen as the starting point of enterprising travellers across the Sahara southward to Lake Tchad, and south-westward to Timbuctoo. There are several ancient remains, among which the most remarkable is a magnificent triumphal arch, erected in 164 in honour of the Roman emperors Aurelius Antoninus and Lucius Verus. It consists of huge blocks of marble on the sides and ceiling, and is now used as a storehouse.

TRIPOLI, a mineral substance consisting of silica, 90; alumina, 7; oxide of iron, 3. It occurs massive, with a coarse, dull, earthy fracture; it is meagre and rough to the touch, and yields readily to the nail. Colour, various shades of gray, yellow, and red. It imbibes water, which softens it; when burned it becomes white and is hardened; it is very difficult of fusion.

It was first brought from Tripoli in Africa, but has since been found in France, Italy, and Germany. It is employed in polishing metals, marble, glass, &c.

TRIPOLITZA. [ARCADIA.]

TRIREME (Lat. *triremis*, Gr. τριήρης, 'a galley with three banks of oars'), the war-vessel used by the Greeks in the Persian and Peloponnesian wars, was first employed, it is said, by the Corinthians in their war against Corcyra, B.C. 664. After the epoch of Alexander the Great, vessels with four and five tiers of rowers came into fashion. The Carthaginians employed the latter, styled quinqueremes, which were taken as a model by the Roman shipbuilders. The banks of oars were raised one above another, but not perpendicularly, and consequently the lowest tier of rowers had the shortest oars and the lightest work. The trireme, or quinquereme, was also provided with a square sail, which was hoisted when the wind proved favourable. The great object in all its manœuvres was to run down its opponent by means of its heavily-armed beak or prow, striking it amidships and sinking it, or disabling its banks of rowers, and rendering it an easy prey. Boeckh, in his elaborate and learned work on the 'Public Economy of Athens,' throws much light upon the naval tactics of the Greeks.

TRISETUM, a genus of plants belonging to the natural order of *Grasses*. *T. flavescens*, Golden Oat or Yellow Oat grass, is common in Great Britain, especially in rich pastures. This grass does not thrive when cultivated alone. Sheep are very fond of it. *T. pubescens*, Downy Oat-grass, is a native of Britain. For cultivation it is only a second-rate grass: its produce, however, is good, and it impoverishes the soil but little. By cultivation it loses the downy character of the leaves, which is generally more evident the poorer the soil on which it grows. It grows naturally on poor, dry, chalky soils. The other species of this genus are not cultivated.

TRISMEGISTUS, or the 'Thrice-great,' was an epithet given to the Egyptian Hermes by the Neoplatonists and the alchymists. He is said to have invented the art of writing, and to have first taught the sciences of astronomy, astrology, &c.

TRISTAN D'ACUNHA, a group of islands in the Southern Atlantic, S.S.E. of St. Helena, and E.S.E. of the Cape of Good Hope. The islands are three in number; the largest, to which the name of Tristan d'Acunha properly belongs, is between 19 and 20 miles in circumference; of the two smaller, that which is named Nightingale Island lies to the south, and that named Inaccessible Island to the south-west. Water is good and abundant in the large island, and vessels touching there can easily procure supplies of fresh provisions. These islands were discovered in 1506, by the fleet under Tristan d'Acunha, a Portuguese naval commander, whose name they have ever since borne. They are claimed by Great Britain, and an English garrison was maintained here during the captivity of Napoleon I. at St. Helena.

In 1811 three Americans had settled in the principal island, and one of them, named Jonathan Lambert, had proclaimed himself sovereign proprietor; but the little colony was soon afterwards abandoned, and possession formally taken by the British government. Several families voluntarily emigrated there, and a corporal, named Glass, was chosen by them as 'governor.' In 1824 the population numbered twenty-two men and three women. In 1836, it had increased to forty-two, who cultivated an extensive tract of ground, and grew wheat, barley, oats, potatoes, carrots, onions, pumpkins, and other vegetables, besides breeding bullocks, cows, sheep, hogs, goats, rabbits, and poultry.

The island was visited by Captain Denham, of H.M.S. *Herald*, on the 11th of November, 1852. At that time the population amounted to eighty-five persons, all English by association, though not by birth and parentage. They were all members of the Church of England, and under the pastoral care of the Rev. William Taylor.

On the 5th of August, 1867, H.R.H. the duke of Edinburgh, then in command of H.M.S. *Galatea*, landed at Tristan d'Acunha, inspected the different cottages, and visited all the families in succession. The prince's chaplain at the same time baptized sixteen children. The little village, in memory of this visit, was named Edinburgh. The inhabitants were found to be remarkably healthy, contented, clean, neat, and apparently free from the usual vices of civilization. They possessed about 500 head of cattle, and 200 sheep. When the

population increases beyond the number which the resources of the island can conveniently support, the surplus is disposed of by emigration to the Cape. Thus, in 1857 H.M.S. *Geyser* took thither forty-five of them, together with the chaplain, Mr. Taylor, and about the same time five families went to the United States. There are now about fifty-three inhabitants in all. The settlement consists of eleven houses, each with its small portion of land, inclosed by walls of loose stones, about 4 feet high. The houses are well and substantially built of stone.

Tristan d'Acunha is situated in lat. 37° 2′ 48″ S., and long. 12° 18′ 39″ W., about 1320 miles to the south of St. Helena. Its mountain peak attains an elevation of 8350 feet above the sea. (*Sailing Directory for South Atlantic Ocean; Good Words*, November, 1867, &c.)

TRITICUM, the genus of plants yielding the various kinds of wheat. It derives its name, according to Varro, from *tritum*, 'ground' or 'rubbed,' because the fruit in its preparation as a food for man undergoes the process of grinding or trituration. The various kinds of wheat have been known from a very early period, and mention is made of it as a food in the earliest records of the history of man. Both the Egyptians and Jews made use of it as an article of diet, and it is early mentioned in the Bible. On account of the early cultivation of many of the kinds of wheat as articles of diet, it is impossible to tell where the most common species are really indigenous. All, however, are found most abundantly in temperate climates, and there take the place of the foods used in the hotter parts of the world. Wheat is in northern climates what rice and maize are in warmer ones. The part of the plant which yields so large a proportion of human food is the fruit, seeds, or grain. When the fruit is ground, the testa, or seed-coat, is separated from what is called the flour, which consists of the powdered albumen and embryo of the seed. The proximate vegetable principles which it contains are starch and gluten. The former is highly carbonized, whilst the latter is characterized by possessing nitrogen. Foods that contain carbonaceous matters are fattening, whilst those that contain nitrogen are strengthening. It is thus that wheat flour has come to be the staple article of diet of the human race in most countries of the world.

T. vulgare, Common Wheat, includes the *T. æstivum* and *T. hybernum* of botanists. They appear, however, to be only varieties of this species, differing in their periods of growth. Its native country is not well ascertained: it has been found wild in some districts of Persia, also of Siberia, apparently removed from the influence of cultivation. The variety called *T. æstivum* is the type of all the summer and spring wheats. The *T. hybernum* is the Lammas or Winter Wheat, and embraces by far the greater number of varieties which are cultivated for food. *T. turgidum*, Turgid, Cone, or English Wheat, has about ten varieties, half of which are summer and half winter wheats. *T. durum*, Beard Wheat, is a native of Switzerland. It has several varieties, all of which produce summer wheats, and are better known in Italy, Sicily, and Spain, than in this country. *T. Polonicum*, Polish Wheat, is found native in some parts of Europe, not, however, in the country which gives it its name. In cultivation it yields summer wheats, which are adapted for warmer climates than Great Britain. *T. spelta*, Spelt Wheat, is much cultivated in Germany. *T. dicoccum*, Two-grained or Rice Wheat, is the *T. amyleum* of some authors, and is grown with the other spelts in Germany. *T. monococcum*, One-grained Wheat, is frequently found in Switzerland, and is used especially for making gruel. *T. junceum*, Sea Rushy Wheat-grass, is a frequent plant on our sandy sea-shores, and with the *Carex arenaria*, *Elymus arenarius*, and *Festuca rubra*, is one of the plants that binds the sands. Under the influence of the stems and roots of these plants whole districts are rendered cultivable which would otherwise be a mass of barren moving sands. *T. caninum*, Bearded Wheat-grass, is common in England. Its produce of nutritive matter is considerable. It yields a very early crop when cultivated, and is recommended to be grown on soils of an inferior quality, instead of rye-grass. *T. cristatum*, Crested Wheat-grass, is a native of Britain, and yields much nutritive matter. On this account it is recommended as a good early grass for heath soils.

TRIUMPH (*Triumphus*) is in general a solemn procession for the purpose of celebrating a victory. Such processions have been customary in all warlike nations, but they have never formed so prominent a feature in the history of a people as among the Romans. The appearance presented by Rome on the occasion of these festivals was joyous in the extreme. Work was suspended, it being a day of general holiday; the temples were thrown open, and decorated with flowers; the populace, clad in their gayest attire, crowded every elevated place from which a view of the procession could be obtained; and banquets were spread before every door. The *imperator* himself, the hero of the day, after pronouncing a eulogy on the bravery of his soldiers, ascended his triumphal car, and entered the city by the *porta triumphalis*, where he was met by the senate, and where the procession really began. Headed by the magistrates, the senate marched first, next came a body of trumpeters, then a train of carriages and frames laden with the spoils of the vanquished, after which a body of flute-players, followed by the oxen to be sacrificed, and the sacrificing priests, &c., the distinguished captives, with bands of inferior prisoners in chains, after whom walked the lictors, having the fasces wreathed with laurel. Then came the *imperator* himself, in a circular chariot, attired in an embroidered robe (*toga picta*) and flowered tunic (*tunica palmata*), bearing in his right hand a laurel bough, in his left a sceptre, and having his brow garlanded with Delphic laurel. Accompanying him were his grown-up sons, his other children, and intimate friends, the legates, tribunes, and equites, riding behind. The rear was brought up by the remainder of the soldiers, singing or jesting at their pleasure, it being a day of carnival and license. On the arrival of the procession at the Capitoline, some of the captive chiefs were taken aside and put to death; after which the oxen were sacrificed, and the laurel wreath placed on the brow of Jupiter. A public banquet was given in the evening, and the emperor on some occasions was even provided with a site for a house at the public expense. Such a triumph was the highest honour that a military commander could look for; it was granted by the senate after any victory, provided certain conditions had been complied with, and if it was thought sufficiently important to deserve it. Among the principal conditions on which the triumph was granted, were (1) that the general should have held one of the great offices of the republic, either the dictatorship, consulship, or prætorship; (2) that the advantages gained by the victory, and the number of the enemies slain, should come up to the amount prescribed by law; (3) that the victory should have been gained over a foreign enemy, and not in a

civil war; (4) that the dominion of the Roman people should have been extended by the victory, and that it should not be a mere reparation of losses previously sustained; (5) that the war should be actually concluded by it, so as to enable the army to quit the enemy's country.

During the empire, the emperor himself, being the chief general of all the armies, was the only person that could claim a triumph, and it was rarely if ever granted to any one else but a member of the imperial family. Inferior generals received other compensations. All the triumphs that had been celebrated at Rome were carefully recorded in the Fasti Triumphales, and their total number, from the earliest times down to the last, that of Belisarius over the Vandals, has been calculated to amount to 350.

A lesser kind of triumph was called *Ovatio*, perhaps from *ovis*, 'a sheep,' which the general offered to Jupiter, instead of a bull. It was granted after victories which were not of sufficient importance to deserve the solemn triumph. The principal difference between the two was that in an ovation the general entered the city on foot, and in later times on horseback; he wore only the toga prætexta, and his brow was adorned with a wreath of myrtle. He carried no sceptre, and was frequently not accompanied by his army.

TRIUMVIRI, or TRE'SVIRI, that is 'three men.' A great number of offices at Rome, both ordinary and extraordinary (commissions), were held by three persons in conjunction, who thus formed a board which was intrusted with the management or administration of certain affairs. The office itself was called triumvirate (triumviratus). Extraordinary triumviri were appointed on various occasions and emergencies; for example, when a new colony was to be founded, the whole management of the business, together with the distribution of lands among the colonists, was usually intrusted to triumviri, whose full title was 'trumviri coloniæ deducendæ,' or 'agro dividendo.'

The triumvirate which has acquired the greatest celebrity in the history of Rome is that which was established towards the end of the republic by Octavianus, Antonius, and Lepidus, B.C. 43. Their power and its duration were sanctioned by a senatus consultum, and is usually called the second triumvirate. The first triumvirate, if we may call it so, was merely a private coalition entered into between Cæsar, Pompey, and Crassus, the three most powerful men of their time, the object of which was to carry out their own schemes of political aggrandisement, in spite of the opposition of the senate. The title triumviri was perhaps never borne by them; it was certainly not recognized either by the senate or the people.

The regular triumviri belonged to the minor magistrates. Among them we shall mention:—1. The Triumviri Capitales, who were instituted about the year B.C. 292, and were in many respects the successors of the quæstores parricidii. They inquired into capital offences, apprehended criminals and committed them to prison, wherever they discovered them, and also carried into effect the sentence passed upon them. 2. The Triumviri Monetales, or the inspectors of the mint. 3. The Triumviri Nocturni, whose duty it was to superintend the watchmen in the city at night, and to prevent or put out fires in the city.

TROAD. [TROY.]

TROCHAIC VERSE, a species used by the Greek and Latin poets, especially by the tragedians and comedians. The foot from which it takes its name and of which it principally consists is the trochee (— ⏑), which is combined, like the iambus and anapæst, into *metres* of two feet each. The most common form of the Trochaic verse is that which is composed of a perfect dimeter, followed by a dimeter wanting the last half-foot. This form of verse is the 'Trochaic Tetrameter Catalectic' of the Greeks, which was also called by the Romans *quadratus*, from its containing four metres, and *septenarius*, from its containing seven complete feet.

TROCHELLA, a sub-genus of *Calyptræa*, in the family *Haliotidæ*.

Sub-generic Character.—Shell conical, patelliform; spire central, of two or more whorls; umbilicus closed.

Examples, *Trochella auriculata*, Sow., and *Trochella pileus*, Sow.

TROCHI'DÆ, the name of a family of testaceous turbinated gastropods, of the order *Pectinibranchiata*.

The genus *Trochus* of Linnæus was placed by him between *Murex* and *Turbo*, in his last edition of the 'Systema Naturæ,' and comprised twenty-six species.

The *Trochoidea* of Cuvier form the first family of his pectinibranchiate gastropods [PECTINIBRANCHIATA], and are defined by him as distinguishable by their shell, whose aperture is entire, without notch or canal for a mantle-siphon, the animals being destitute of one; and by an operculum or some organ in lieu of it. They are, Cuvier observes, the *Paracephalophora Dioica Asiphonobranchiata* of M. de Blainville.

The following genera and sub-genera are arranged by Cuvier under his *Trochoides*:—

Les Toupies (*Trochus*, Linn.), subdivision *a*, no umbilicus; *b*, umbilicated. Les Cadrans (*Solarium*, Montf.).

Next in order follows the genus *Turbo*, Linn., with its sub-genera, and then come the genera *Paludina*, *Littorina*, *Monodonta*, or rather *Monodon*, *Phasianella*, *Ampullaria* with its sub-genera, *Melania* with its sub-genera, *Acteon* (*Tornatella*, Lam.), *Pyramidella*, *Janthina*, and *Nerita* with its sub-genera.

The *Trochoides* are immediately followed by the *Capuloides* (*Capulus*, *Hipponyx*, *Crepidula*, &c.).

The shells of the genus *Trochus*, the representative of the family, are pyramidal with flat bases, depressed mouth, obliquely triangular, pearly inside. The columella is always twisted, and the operculum horny and many-whirled. About 150 species have been described. There are many fossil species.

TROCHI'LIDÆ, the scientific name for the family of *Humming Birds*.

Linné, in his last edition of the 'Systema Naturæ,' placed the genus at the end of his order *Picæ*, and next to the genus *Certhia*.

Cuvier includes the *Colibris* (*Trochilus*, Linn.) in his order *Passereaux*, placing the group between the *Grimpereaux*, or *Creepers* (*Certhia*, Linn.), which in Cuvier's arrangement comprises the Sun-birds and the Hoopoes (*Upupa*, Linn.).

M. Lesson, in his 'Manuel,' places the *Trochilidæ* next to the *Philledonidæ*, and at the end of the *Tenuirostres*, making the family consist of two genera only, *Colibri* and *Ornismya*.

Zoological Characters.—Bill longer than the head, straight or arched, the upper mandible a little widened at the base, rounded above and beyond the nostrils, tapering into a point. Lower mandible straight or slightly bent above and below, entering within the upper mandible, dilating a little towards the point, and of the same length as the upper mandible.

Nostrils basal, very small, covered by the advanced

feathers of the forehead, placed in a lateral fosset, separated from each other by a slight ridge.

Wings with the quill feathers graduated. The first the longest, and so on in succession.

Tail composed of ten feathers, very variable in length and form.

Tarsi delicate, slender, naked or feathered to the heels, scutellated, having in front three equal toes, the two internal ones a little connected at their base, the hind toe rather stout, all furnished with compressed, curved, and hooked claws, which are rather robust for the toes.

Tongue extensible, long, divided at the summit into two widened filaments, which are slightly spatulate, and supported by two very long branches of the os hyoïdes acting like a spring, tubular in the centre, or formed of two co-adapted cartilaginous canals.

Geographical Distribution. — America (including many of the adjoining islands), principally between the tropics; but, at the same time, there are species which range very far to the south, and others to the north.

Food.—Soft insects, such as spiders, tipulæ, gnats, ants, and also small coleopterous insects; accessorily the honied juice of flowers.

Plumage.—That of the male brilliant, sumptuous, and with metallic reflections. The livery of the females is nearly always sombre, tarnished, or with but little brilliancy. The young resemble the females, and only gradually gain the dress of the males. The feathers have their barbules constantly disposed in facets, even in those whose plumage is dull.

Habits, more or less migratorial.

This group, *Trochilus*, Lesson divides into twenty-seven races or tribes, some of which are again subdivided into minor sections. Within the last few years numerous species unknown to Lesson have been discovered, and new light has thereby been thrown upon the whole family, rendering the re-arrangement of its component parts absolutely necessary. Mr. Gould undertook this arduous task, and issued a work on the *Trochilidæ*, with admirable figures of every species.

If we look at the skeleton of a humming-bird (remembering that great and small are relative terms) we shall be struck with the provision made in the sternum and parts connected with it, for the vast development of the muscles of flight. The sternum is deep and wide, and the pectoral muscles form nearly the whole, by weight or measurement, of the fleshy substance of the bird.

Skeleton of Humming-bird.

The tongue is the principal organ on which these brilliant creatures depend for the power of obtaining their food—nectar, and the insects which lurk in the nectaries of flowers. The tongue is so framed that it can be darted out of the bill by a sudden action of the os hyoïdes, comparable to that of a spring suddenly released from the detent. It is very long, and can be protruded a good way from the bill. It is composed of two muscular fibrous cylinders attached to each other throughout a great portion of their continuity, and separated towards the point; so that the two tubes, slightly enlarged towards this part, separate from each other, and each presents a little blade, which is concave within and convex externally. The two small blades, or elongated spoon-like terminations, seize the insects or lick up the honied exudations, which are on the instant carried to the aperture of the œsophagus, and forthwith swallowed. The long and slender bill comes in admirably to aid the insertion of the tongue into the nectaries of flowers.

The mode of flight of the Humming-birds is peculiar. They remain as it were suspended in the air, in a space barely sufficient for them to move their wings, while the humming noise proceeds from the surprising velocity with which they perform the motion that keeps their bodies in the air apparently immovable for hours together. When they are thus poised or suspended, their wings become invisible, or only like a mist. No one has described their flight more accurately than Buffon:—'The vibrations of the wings is so rapid that the bird poised in the air appears not only immovable, but entirely without action. It is seen to stop thus for some instants before a flower and dart off like a gleam to another: it visits them all, plunging its little tongue into their bosom, caressing them with its wings, without ever settling, but at the same time never quitting them.'

The ordinary French term for these birds is *Colibri*, according to Buffon a Carib word. The generic title of Linnæus is infelicitous, viz., *Trochilus* (Τροχιλος) the name given by Aristotle to two distinct birds, as it would appear—one probably a wren, the other one of the *Charadriadæ*, or sand-pipers, of Egypt.

Their voice is in general nothing more than a shary monotone, frequently repeated under the influence of excitement. At other times they are silent for hours. It is not improbable that some species may sing; but on this point the evidence of travellers is conflicting.

Their nests are as wonderful as any that are made. They vary greatly in form and structure; but in all the soft and delicate materials are so put together as to furnish as much warmth as possible, an object of importance where the body of the parent is generally so small. Cotton, thistle-down, delicate fibres, a fungus-like substance, and other soft materials woven into a compact and fleecy texture, enter into their composition. The outside is in most instances covered with lichens, generally supposed to be stuck on with a sort of glue secreted by the bird; but we have reason to believe that this is not the case. The nest, generally, appears to be made by warping spiders' webs over fragments of plants, their down, lichens, &c.; and the lichens, which are never turned the wrong way, are secured by the webs only. The Humming-birds generally lay two white eggs of an elongated form, which in some species are extraordinarily small. Sir William Jardine states that the Doctor Humming-bird, as it is provincially termed (*Trochilus hirsutus*), builds its nest suspended, with the entrance somewhat downwards, and lays only one egg. This nest is described as being of a lengthened form, composed of dried grass, slender roots, moss, &c., and as suspended from the leaf of some reed-like plant, to which it is cemented chiefly by the threads of spiders or caterpillars.

The parent birds are bold, and even fierce, in the defence of their young. In sleeping they frequently suspend themselves by the feet with their head downwards, in the manner of some parrots.

curucui, Linn., was employed by them, according to Hernandes (c. xliii.), in the fabrication of the figures and pictures used on festivals, in war, and in their temples. They were probably kept in one of the two houses which formed the royal menagerie of ancient Mexico, one of these houses being appropriated to birds which did not live by prey; the other to birds of prey, quadrupeds, and reptiles. Three hundred men, according to Cortes, were employed to take care of these birds, of whom some procured their food, others distributed it, others took care of the eggs at the time of incubation; whilst others, at certain seasons, picked their plumage —for the king not only delighted in the sight of so many species, but was very careful of their feathers for the sake of the mosaic images and pictures, as well as of the other works which were made of them.

Examples.—The Mexican Trogon (*Trogon Mexicanus*, Swains.); the Resplendent Trogon (*Trogon* (*Calurus*) *resplendens*, Gould), a bird of incomparable brilliancy, and distinguished by the extreme length of the long loose upper tail-coverts. Colour, gorgeous golden green. Locality, Mexico.

African Species.—Example.—The African Trogon (*Trogon* (*Apaloderma*) *Narina*, Le Vaillant). Locality, South Africa. Inhabits dense woods. By the title *Narina* Le Vaillant celebrates the name of a Gonaqua Hottentot girl, whose charms had made a deep impression upon him.

Asiatic Trogons.—Example.—Reinwardt's Trogon (*Trogon* (*Apaloderma*) *Reinwardtii*, Temm.). Locality, Java and Sumatra, where it was discovered by Professor Reinwardt, whose name it bears.

TROJAN WAR, a celebrated epoch in classical history, which occurred about thirteen centuries before the Christian era. It was undertaken by the Grecian states to recover Helen, wife of Menelaus, who had been carried away by Paris, son of Priam, king of Troy. This event has formed the subject of two of the finest poems in the world—Homer's 'Iliad,' and Virgil's 'Æneid.' [TROY.]

TROLLIUS, a genus of plants belonging to the natural order *Ranunculaceæ*. The name of this genus is derived from *trollen*, a German word expressive of a rolling or globular motion. The German name of the genus is *Trollblume*; the English is Globe-flower; and the French *Boule d'Or*. *T. Europæus*, European or Mountain Globe-flower, is abundant in the whole chain of the Alps, and is also found in mountainous districts in the north of England, Ireland, Wales, and Scotland.

TROMBO'NE is a deep-toned trumpet, composed of sliding tubes, by means of which every sound in the diatonic and chromatic scales, being within its compass, is obtained in perfect tune. It is of three kinds—the *alto*, the *tenor*, and the *base*, and these, in orchestral music, are generally used together, forming a complete harmony in themselves.

The scale of the *Alto-trombone* is from C, the second space in the base, to G, an octave above the treble clef; that of the *Tenor-trombone* is from B, the second line in the base, to A, the second space in the treble; and that of the *Base-trombone* is from C, an octave below the second space in the base, to G, the second line in the treble.

The trombone, when judiciously employed, as, for instance, in Mozart's 'Requiem,' and in his 'Don Giovanni,' is most efficacious in producing great and sublime effects, the tone being grander and more powerful than that of the trumpet.

TROMP, MARTEN HARPERTZOON VAN, the son of a Dutch naval officer, was born at the Briel in 1597. He was present with his father at the engagement between the Dutch and the Spanish fleets under the cannon of Gibraltar, April 25, 1607; and his father being not long after killed in an engagement with an English cruiser, and his ship captured, the lad was detained two years and a half a prisoner. For some years after this adventure his career was obscure. In 1622 we find him a lieutenant on board a ship of the line; and two years later Prince Maurice gave him the command of a frigate.

In 1637, after a long period of inaction, Tromp was made lieutenant-admiral, and received the command of a squadron of eleven ships, with which, in 1637 and 1638, he took so many vessels from the Spaniards that the States presented him with a gold chain, and the king of France conferred upon him the order of St. Michel. In April, 1639, Tromp again set sail to cruise against the Spaniards. On September 15, with only twelve ships in company, he came in sight of a large Spanish fleet off the coast of Sussex. After making several indecisive attacks, he, on October 13, again came up with it, and by this time both sides were much strengthened. The action commenced on the 21st. The result was, that Van Tromp gained a complete victory, and thirteen richly-laden galleons fell into his hands.

He also rendered important services to his country in the wars of 1640 and 1641; and after Cromwell had seized the helm of government in England, was opposed on the seas by his great rival Blake, who frequently defeated him. [BLAKE.] In his last battle the Dutch admiral was attacked by Monk, duke of Albemarle. The fleets engaged July 29, 1653. Both sides claimed the victory; but the Dutch suffered an irreparable loss by the death of Tromp.

TROMP, CORNELIS VAN, second son of the great admiral, was born at Rotterdam, September 9, 1629. He was educated for the navy; and at the age of twenty-one commanded a ship in the squadron dispatched, in 1650, against the emperor of Morocco.

In 1652 and 1653 he served in the Mediterranean, distinguished himself in various engagements, and was made rear-admiral.

In 1665, when war with England commenced, Van Tromp was attached with his squadron to the fleet commanded by Wassenaer Van Opdam. In the first action with the duke of York, July 13, the Dutch were beaten, but Tromp greatly distinguished himself.

In 1666 he accepted the command of the *Hollandia* of eighty-two guns, and was present at the victory which Ruyter gained over the English, June 11, and four successive days. Another engagement took place, August 4, which was renewed on the 5th. Tromp had the advantage over the vice-admiral (Smith) who was opposed to him; but Ruyter was worsted. The latter attributed his defeat to Tromp's neglect to support him, and complained of his misconduct. Tromp recriminated, but the States deprived him of his commission, and placed him under provisory arrest at the Hague.

In 1673 his commission was restored to him by the stadtholder, afterwards William III., and a reconciliation took place between him and Ruyter. In the engagements of June 7 and 14, with the allied fleets of France and England, he displayed the most reckless courage; but on both occasions he was indebted to Ruyter for bringing him off when he had engaged himself too far.

A descent on the coast of France was projected by the States, in 1674, and Tromp was appointed to carry

it into execution; but the result was unsuccessful. In 1675 he visited England, and was created a baron by Charles II. In 1676 he was dispatched with a fleet to assist the king of Denmark in his war with Sweden. Van Tromp, on his return to Holland, was appointed lieutenant admiral-general of the United Provinces. He accompanied the prince of Orange in the expedition against St. Omer. After this he retired from public life till 1691, when he was induced to accept the command of a fleet against France, but died at Amsterdam, May 21 or 29, before its equipments were completed.

TRONDHIEM, or THRONDHJEM, more commonly known by the name of *Drontheim*, but by the natives pronounced *Tronyem*, is the most northern of the old provinces of Norway, extending from 62° to 71° 10′ N. lat. It lies between 5° and 31° E. long., and its total area has been officially estimated at 58,423 square miles.

Trondhiem comprehends the countries situated on the northern declivity of the Norrska Fiellen, and those which lie on the western and steeper slope of the Kiölen mountains; the greater part of it is exceedingly mountainous, and very little is adapted for agricultural purposes. This circumstance, united to the severity of the climate, is the cause of its very small population, which is only 302,000, or about five to the square mile. Trondhiem is now divided into four provinces, North Trondhiem, South Trondhiem, Nordland, and Finmarken.

North and South Trondhiem are indented by numerous inlets, of which Trondhiems Fiord is the most important; this is 60 miles long by 3 to 5 wide. South of it the country lies on the northern declivity of the Lang Field and Dovre Field, which are portions of the Norrska Fiellen. The coast is here very deeply indented by arms of the sea, which form numerous islands and peninsulas. Many of the fiords extend inland 50 miles, and on their banks are the only fertile spots. The interior of the country is occupied by the mountain region of the Norrska Fiellen, which rises in one point to a height of 7489 feet; it stands upon a table-land, which is furrowed by several steep ravines. The country along the southern shores of Trondhiems Fiord contains a much greater portion of arable land, and is more extensively cultivated and more populous than the northern. It is watered by four rivers, which, from west to east, are called Oerkel, Gual, Nid, and Stor Elf. The small district of Röraas lies on the Dovre Field, close to the boundary of Sweden, and comprehends the country in which the Glommen Elf originates. Northward of Trondhiems Fiord, an immense mass of high rocks extends along the sea from the shores of the fiords to the mouth of Namsen Elf, which is the largest of the rivers of Norway falling into the North Sea.

Nordland comprehends all the countries lying between the parallel of the island of Leköe and the Quaenanger Fiord. The southern part is called Helgeland, the central district Salten, and the northern portion Tromsöe. The islands of Lofoden and of Senyen are also included in it. Helgeland has numerous islands near the shore; but the fiords are not deep. The interior is filled up by mountains rising from 1000 to 1500 feet, between which occur numerous narrow valleys and depressions, which in general are well wooded, though the trees rarely attain the size of timber trees. Salten comprehends the country between Cape Kunnen and Ofoden Fiord; it is the most desolate part of Norway; and the coast is marked by exceedingly precipitous promontories. The *Lofoden Islands* lie opposite the coast of Salten, and are divided from it by an arm of the sea called West Fiorden. They constitute a rocky chain, which near the continent runs nearly due W., but farther to the W. declines to the S.W. The islands are separated from each other by narrow straits, through which the sea flows during the tides with a rapidity resembling a torrent. In some parts it forms very deep and extensive eddies, among which the whirlpool called the *Malström*, and which is found between the islands of Moskenäsöe and Mosköe, has obtained celebrity, as it is dangerous to navigation in stormy weather, and during the strength of the tides, and has caused much loss of life. The population of this group does not exceed 5000 individuals; but during the fishing season the islands are visited by between 3000 and 4000 boats, manned by from 15,000 to 20,000 men. The annual produce of the fisheries is estimated at about 9000 tons of dried fish, 22,000 barrels of cod-liver oil, and 6000 barrels of roe. The cod fishery terminates in April, and the herring fishery then commences, and continues through the summer. Several other kinds of fish are caught, and there are immense quantities of lobsters and oysters. The frequent storms and strong tidal currents render the occupation an exceedingly hazardous one. The fisheries have been carried on since the eleventh century. The district of Tromsöe is on the mainland, somewhat beyond the parallel of the Lofoden Islands; it is a mountainous region.

Finmarken comprehends the most northern portion of Trondhiem, and, indeed, of the continent of Europe, extending from Quaenanger Fiord to the Tana-Elf and Varanger Fiord. Along its western side, between the Quaenanger Fiord and the Alten Fiord, extends a mountain range, which terminates near the sea in the isolated Yekuls Field, rising to 3700 feet, the most northern glacier (70° N. lat.). The country east of this range contains a more elevated and a lower region, of which the former lies to the north and the latter to the south. The permanent settlements in this district are only found in the recesses of the fiords. The lower region is in general a plain, which in its highest point, near the sources of the Alten Elf, is about 1200 feet high, and contains numerous small lakes. The snow-line in this province is less than 3000 feet above the level of the sea, and the mountains in the interior are thus perpetually covered. Agriculture is almost impracticable, and fish and game constitute the principal food of the inhabitants. No trees are found in the higher latitudes, but the turf marshes afford a good supply of fuel. The rein-deer is the chief source of wealth in the north, and the cod fisheries in the south. The population consists principally of Lapps. Several large islands lie along the coast of Finmarken, west of the Porsanger Fiord. The largest of them, Seyland and Soröe, rise to a great elevation, and are inhabited by a few fishermen. On Qualöe is a commercial place, *Hammerfest*, the most northern town in Europe, which has about 400 inhabitants. [NORWAY.] The most northern island is Margeröe, a bare rock, which towards the north terminates in the North Cape, a huge mass of rocks rising to 1500 feet above the sea.

TRONDHIEM, the capital of the above country, is built on the southern shore of Trondhiems Fiord, at the mouth of the Nid Elf, which river nearly encircles it. On the land side it is commanded by a series of heights which make it incapable of defence in that direction, but towards the sea it possesses strong fortifications, both on the mainland and more especially on the small rocky islands of Munkholm and Christiansteen. The town has spacious, regularly-formed, and remarkably

clean streets, with water cisterns at their intersections. It was once built almost entirely of wood, which, in consequence of the ravages of repeated fires, has chiefly given place to houses of stone or brick. The town is the seat of government for the province, and of a bishopric. The most remarkable edifices and establishments are the cathedral, the great object of interest, much dilapidated by the ravages of early barbarians, and defaced by the bad taste displayed in more modern renovations, but still venerable from the antiquity of some of its parts, which are as old as 1033, and entitled to rank, as a whole, as the most remarkable ecclesiastical structure in the kingdom; the palace of the old Norwegian kings, when Trondhjem was the capital, now converted into a military and naval arsenal; a museum, including a picture-gallery and a library with some rare manuscripts; literary and scientific institutions; asylums for the aged and deaf-mutes; grammar, Lancasterian, and other schools; exchange, bank, a court-house, custom-house, handsome theatre, &c. The manufactures include excellent capes, hat-covers, &c., of goat-skins, trinkets, &c. The breweries are famous for their beer, which is largely exported. There are also some extensive sugar-refineries, distilleries, &c. The building-yards fit out vessels which bear a high reputation for their sailing properties. The harbour is indifferent, not admitting vessels which draw more than 10 or 12 feet: the roadstead is exposed to a heavy swell from the N. and E., and has loose ground in 20 fathoms of water. Trondhiem Fiord never freezes, and the cold of winter, though severe, is not so great as in many places further south. The surrounding country is studded with merchants' villas, and the suburbs of Blakland and Ilen are built on picturesque heights above the old town. There is a carriage road from Trondhiem to Stockholm, and steamers run to Hammerfest and other parts during the summer. The trade consists chiefly in exports of timber, dried and salted fish, tar, copper from Röraas, and mill-stones. The beauty of the women of Trondhiem—many of whom are distinguished for their literary tastes—is celebrated, and the elegance of its society gives it much more the appearance of a capital than Christiana, which supplanted it in this respect on the union of Norway to Denmark. The population of the town is about 17,000. (*Imperial Gazetteer.*)

TROPÆO'LACEÆ, a small sub-order of plants in the natural system of Lindley, in the natural order *Balsaminaceæ*. Jussieu makes it a distinct order. It includes one well-known genus.

TROPÆ'OLUM, a genus of plants, the type of the sub-order *Tropæolaceæ*. The species are all inhabitants of South America. De Candolle enumerates thirteen, Don eighteen, and some others have been lately added to their number. They are all climbing plants.

T. minus, Small Indian Cress or Nasturtium, is a native of Peru. It has deep yellow flowers streaked with orange and red. The whole plant possesses an acrid flavour and odour, which are peculiar to this order and the *Cruciferæ*. It is on this account that all the species of Tropæolum have obtained the common name of *Nasturtium*, which belongs to a genus of *Cruciferæ*. *T. majus*, Great Indian Cress or Nasturtium, is also a native of Peru. The fruit, when green, like that of the preceding species, is made into a pickle. It grows in Great Britain in the open air. *T. aduncum*, Hooked Indian Cress or Nasturtium, a native of both Mexico and Peru, is a very tender plant, requiring greenhouse cultivation in this country. *T. tricolorum*, the Tricolor Indian Cress or Nasturtium, a native of Chili, is the most showy and handsome of the species. *T. tuberosum* has tuberous roots which are eaten when boiled. It is a native of Peru. *T. pentaphyllum*, the Five-leaved Indian Cress or Nasturtium, is indigenous in Buenos Ayres, Monte Video, and Brazil in the province of Cisplatine. *T. azureum*, Purple Indian Cress or Nasturtium, was discovered by Mr. Miers, and first described in his 'Travels in Chili,' but had been previously seen by Mr. Bridges on the Carycam de Quillota, 4000 feet above the surface of the sea.

Most of the other species, and especially the graceful *Tropæolum Canariense*, a climbing plant 12 to 14 feet high, have obtained a place in our collections, on account of their handsome and variously-coloured flowers. They will thrive in a light rich soil.

TROPHY (Lat. *tropæum*, Gr. τροπαιον, from *trepo*, 'to put to flight'—the *h* in the English being an intrusive letter) among the ancients was a monument or memorial in commemoration of some victory. It was originally erected on the spot where an enemy had been conquered or put to flight. It was a practice among the Greeks seldom to erect trophies in any other place than the field of battle. A trophy in Greece after a victory on land appears to have consisted of a trunk of a tree, fixed on some eminence and adorned with the spoils and armour of the vanquished. An inscription usually recorded the names of the conqueror and the conquered, and the whole trophy was dedicated to some divinity. After a sea-fight the trophy consisted of the beaks and stern ornaments of the captured vessels set up on the nearest coast. The Romans, down to the latter period of the republic, never erected any trophies: the spoils of a vanquished enemy were partly distributed among the soldiers, partly dedicated in the temples of the gods, and partly applied as ornaments for other public buildings and places. When, however, they adopted the custom of raising trophies on the field of battle, these usually consisted of more solid structures than the Greek, such as towers, columns, &c.

TROPIC BIRD (*Phaëton*, Linn.), a genus of palmipedes, generally placed among the *Pelecanidæ*, but by some among the *Laridæ*, or Gulls.

Two species only are known, the Common Tropic Bird (*Phaëton ætherius*), and the Red-tailed Tropic Bird (*Ph. phœnicurus*). Size, about that of a large pigeon.

This genus, so well known to navigators as the harbinger of the tropics, is distinguished at once by the two long slender tail-feathers, which have obtained for the species, of which two only are recorded, the French name of *Paille-en-Queue*. Their length of wing and comparatively feeble feet proclaim them formed for flight, and they are accordingly swift and untired on the wing, disporting in the air far at sea; and when on land (to which they do not often retreat for any length of time together, excepting at the period of nidification), perching on rocks and trees. They rarely quit the torrid zone and its neighbourhood.

Lesson remarks that the two species form a well-defined, artificial, and purely geographical group. Their habitual domicile in the torrid zone does not separate them from the land; and they can reach, as they do nearly every night, the isles and lofty rocks that serve them as a place of refuge. Nevertheless, M. Lesson met with them so often in sea-tracts entirely devoid of land, and heard them so often above his head in the calms and fine tropical nights, that he thinks they should be considered as oceanic birds.

Their food consists entirely of fish, which they seize at the surface, swooping down from their altitude with arrow-like velocity. They breed on desolate rocks and lonely islands, numbers as it would appear congregating

together. Catesby, who shot many off the Bermudas during the breeding season, says that, from the inaccessible nature of the cliffs they resorted to, he was prevented from seeing their eggs or nests.

TROPICS, the circles of the earth parallel to the equator which pass through those places to which the sun is vertical at the solstices, being the extreme boundaries of the torrid zone. The latitude of any spot upon either tropic is therefore the same as the obliquity of the ecliptic, and the interval between the northern and southern tropics comprehends every part of the earth at which the sun is ever vertical. The northern is called the Tropic of Cancer, and the southern the Tropic of Capricorn, since the sun, when vertical at places in the first, is at the commencement of the astronomical sign of Cancer; and when vertical at places in the second, is at the commencement of Capricornus.

TROPPAU. [MORAVIA.]

TROUBADOURS (Provençal, *trobar*, from the Italian *trovar*, and French *trouver*, 'to find'), a school of poets who flourished in the south of France, in Catalonia and Arragon, and in the north of Italy, from the eleventh to the latter end of the thirteenth century, and wrote in the Provençal or Romance language, also called the *Langue d'Oc*. They were warmly encouraged by the counts of Toulouse, Provence, and Barcelona, and began to decline in enthusiasm and diminish in numbers after the power of the former was broken by the crusade so remorselessly directed against the Albigenses. The Troubadours, in the palmy days of Provençal poetry, were chiefly knights, who cultivated the art of song for their own pleasure or that of their patrons, and whose compositions were spread abroad by the agency of an inferior order of minstrels, called *jongleurs*. These compositions belonged almost entirely to lyric poetry, and their themes were either of an amatory, satirical, or bacchanalian character; though in stirring times they essayed more ambitious flights, and celebrated 'arma virumque,' heroes and heroic deeds. They indulged in the most complicated metres and artificial rhymes, yet many of the poems which have descended to us are inspired by true poetic fire, and there can be little doubt that the Troubadours did much towards inspiring European literature with its romantic, in contradistinction to its classical, tone. The principal varieties of composition were:—*Tenzones*, or rhythmical duets between two minstrels, reminding one of some of the Eclogues of Theocritus or Virgil; *sirventes*, 'service-songs,' dedicated to the praise of their patron, or to martial and serious subjects; *chansons*, short songs of an amatory character; *cansos*, more ambitious love-songs; *planes*, lamentations on the cruelty, real or supposed, of a real or ideal mistress; *pastoritas*, lays in celebration of rural pleasures and a pastoral life; besides *redondes*, *arbades*, *serenades*, *lais*, *soulas*, and the like.

The Troubadours were emphatically the poets of chivalry, and rose and fell with that peculiar institution. Their most liberal patrons were the principal chivalric leaders, the princes and barons most imbued with the true chivalric spirit; as Raimund and Alphonse, counts of Provence; Raimund de St. Gilles and Raimund IV., counts of Toulouse; Alfonso II., king of Arragon; Alfonso the Wise, king of Castile; Boniface, count of Mountferrat; and Richard I. of England, himself a troubadour of no mean merit. The names and some of the productions of upwards of 200 troubadours have been preserved, but our limited space compels us to restrict our enumeration to the following:—Guillim IX., count of Poitiers, 1087–1127; Bernard de Ventadour, 1140–1195, the son of a serf, warmly encourag by Eleanor, queen of our Henry II.; Jaufre Ruc prince of Blaya, 1140–1170, renowned for his w devotion to the countess of Tripoli, whom, however, never saw till shortly before his death; Pierre Vid 1175–1215, one of the truest poets of the fraternity, l in life and genius a kind of Troubadour-Byron; Bertra de Born, 1180–1195, the antagonist, both with swo and pen, of Henry II.; Folquet de Marseille, 1180–12 afterwards bishop of Toulouse, and a violent persecut of the Albigenses; the nameless monk of Montaud 1180–1200, who was patronized by Alfonso II. Arragon, and died prior of Villafranca; Arnault Dani 1180–1200, whose high honour it is to have be praised by Dante; Raimon de Miravol, 1190–122 and, last of the true troubadours, Guirant Riqui 1250–1294, who appears to have been liberally b friended by Alfonso V., king of Castile.

At Toulouse the 'Capitouls,' or municipal magistrat established an academy called 'Del Gai Saber,' or ' the gay science;' and seven of the best rhymers of t place, styled 'the Seven Troubadours of Toulouse,' we placed at the head of it. They fixed upon the 1st May for holding an annual public festival, to which th gave the name of 'Floral Games.' The first meeti was held in 1324, and was attended by many poets fro various parts of Languedoc. [CLEMENCE ISAURE. The morality of troubadour poetry underwent a refor under this new institution. The pageant of the 'Flor Games' continued to be celebrated till the great Fren revolution.

Much interesting information relative to the Troub dours and their poetry is embodied in Sismondi's *Littéra ture du Midi de l'Europe;* in the ninth chapter Hallam's *Literary History of the Middle Ages;* an Sir G. Cornewall Lewis' *Researches into the Roman Languages.* These are the most accesible for t general reader. The student who would carry his r searches further may consult De Laveleye, *Histoire* la Langue et de la Littérature Provençale (Brusse 1845); Mahn, *Die Werke der Troubadours* (Berli 1846); Fauriel, *Histoire de la Littérature Provença* (Paris, 1846); and Kaunegresser, *Gedichte der Troub dours* (Tübingen, 1852).

TROUS DE LOUP (or *Wolf Holes*), in the milita art, are pits dug in the ground in the form of inverte cones or pyramids, in order to serve as obstacles to t advance of an enemy: each is made about 6 feet diameter, or in breadth, and as many in depth, and pointed stake is planted upright in the bottom. T pits should be disposed chequer-wise in two or thr rows, their centres being at distances of about 10 fe from one another, and their sides should have such slope that if the enemy's riflemen attempt to occu them, they may not be concealed from the view of t troops whom the holes protect. Trous de loup a generally formed before the salient points of field-work or in the intervals between them, the object being break the ranks and otherwise disorganize an attacki force; and they are sometimes executed in rear of sm works in order to protect the gorges when these a without parapets.

TROUT, the common name of various species fishes belonging to the genus *Salmo*. In the artic SALMONIDÆ the characters of the genus *Salmo* an the habits of the *Salmo salar*, common Salmon, a described: we shall confine our remarks here to th species of *Salmo* known by the name of Trout.

The Bull-trout (*S. eriox*) is a thicker fish in propo

tion to its weight than the salmon: the fins and tail are much more muscular; the head is also larger in proportion to its body, and the teeth are longer and stronger. This fish is found abundantly in the Tweed and its tributaries, and also in some of the rivers of the Solway Frith, as well as occasionally in Dorsetshire and Cornwall. The young fish, when they weigh not more than two or three pounds, are called Whitlings. As food their flesh is less esteemed than many others of the salmon tribe, as it is coarse (which is quite in accordance with their strong muscular development), and is of a pale orange or yellow colour. In the markets they obtain only an inferior price. The fish known by the name of the Norway Salmon seems to be identical with this species. They take the bait freely, and when hooked, owing to their powerful muscular structure, make prodigious efforts to escape. It is migratory, and attains a weight of about 25 pounds.

The Salmon-trout (*S. trutta*). This, with the preceding species and the *S. salar*, are the only migratory species of salmon which inhabit the waters of Great Britain. Next to the salmon itself, the salmon-trout is most esteemed as an article of diet. It has a small head, a very broad back, a slightly forked tail; the flesh is a pink colour, and of a rich flavour. This fish is the White Trout of Devonshire, Wales, and Ireland; the Sea-trout, Herling, and Whitling of the Solway; the Finnock of the north and west coasts of Scotland; and the Salmon-trout of the London market. In their migratory habits and the time and mode of depositing their spawn, they resemble very much the common Salmon. The Fordwich Trout of Isaac Walton is the Salmon-trout. The best in the London markets are those from Perth, Dundee, Montrose, and Aberdeen. The largest specimen ever seen by Mr. Yarrell weighed 17 pounds.

The common Trout (*S. fario*) is an inhabitant of most of the lakes and rivers of Britain, and is perhaps, on account of its colours and form, the most lovely and beautiful creature of its class. The variations of its tints are almost infinite; yellow, however, is the predominating ground-colour, varying to an orange, and sometimes passing into a dark greenish black or violet, which is covered over with black and red spots. These great variations in its colour seem to depend on the qualities of its food. Those feeding on fresh-water shrimps have the most brilliant colour, and have the finest flesh; whilst those which are obliged to live chiefly on aquatic vegetables have a much less brilliant colour and less delicate flesh. The average weight of the trout is about a pound or a pound and a half; in ponds and stews they sometimes reach a larger size, and specimens have been seen weighing as much as 15 pounds. Some of the deep pools in the Thames above Oxford yield the finest trout. The Gillaroo Trout of Ireland seems to be only a variety of the common trout. Several of the loughs of Ireland produce this fish.

The Great Gray or Lake Trout (*S. ferox*) was first noticed by Pennant as an inhabitant of Ulswater Lake in Cumberland, and Lough Neagh in Ireland. This fish attains an average weight of 25 pounds, but specimens have been seen weighing 50 or 60. It may be distinguished from the last species by its great size, the large proportional size of the head, and the square extremity of the tail in all its stages of growth. This fish is almost entirely confined to lakes, seldom ascending or descending rivers, and it never migrates to the sea. It is the *S. lacustris* of continental writers; and received its present designation from Sir W. Jardine, who, having found it in Loch Awe and other lochs of Scotland, supposed it was a new species. He named it *ferox*, on account of its exceedingly rapacious habits. The flavour of this fish is indifferent when compared with the salmon and salmon-trout. These fish are generally caught from a boat, and require a rod and line of great strength, on account of their power and activity.

The *Salmo salmulus*, the Parr, or Samlet, is sometimes called a trout, and was supposed to be a distinct species till Mr. Shaw, of Drumlanrig, proved that the Parr are, in reality, young salmon.

The other species of *Salmo* inhabiting Great Britain are the *S. umbla*, the Northern Char, and *S. salvelinus*, the Welsh Char.

TROVER (from the French word *trouver*, 'to find'), the name of a special action on the case. It is applicable to questions respecting the right to personal chattels only. It may be brought either by the owner, or by a bailee, as a carrier, or by a mere finder as against all except the owner. The declaration states that the plaintiff was lawfully possessed as of his own property of certain personal chattels, naming them distinctly, their amount and value; that he afterwards casually lost them, and that they came into the possession of the defendant by *finding*, who afterwards *converted* them to his own use; for which the plaintiff claims damages. This form and the fiction respecting the finding were contrived for the purpose, by assuming a right of possession in the defendant, of enabling the parties to try the bare question as to the right between the plaintiff and defendant to recover or retain the goods. In answer to this declaration the defendant may either plead not guilty, under which plea, since the new rules, the only question raised is the mere fact of the actual conversion, or he may plead specially the circumstances under which, admitting the *conversion*, he claims a right to detain the goods. The fact of the conversion is proved by showing that the defendant upon request distinctly refused to deliver up the goods, or has destroyed them, or has assumed the right to dispose of them. The action is not maintainable by one joint tenant, or tenant in common, or partner, against another, unless in the case where the chattel has been destroyed by the other. This rule is founded on the principle (of the English law), that the possession of one is, by reason of the joint property of all, held to be the possession of all, and therefore no act of conversion can be said to have been committed.

The other pleas which are an answer to this action are, a denial of the property of the plaintiff in the chattel; or the statute of limitations that six years have elapsed since the act of conversion was committed; or any circumstances showing that the defendant has a right to detain the goods, as from having a lien upon them, &c.

The plaintiff must prove that the nature and value of the goods correspond to a certain extent with the statements in the declaration. If he succeeds in obtaining a verdict, the jury may give damages to the amount of the value of the goods, and also such sum in addition as may cover the amount of interest during the time subsequent to the conversion. This action differs from the action of detinue as being brought to recover damages, while the object of the action of detinue is to recover the actual goods.

Trover as the name of a suit is unknown in Scotland, but the remedy is in an action for recovery or delivery of moveables, or for value or damages for deprivation of such.

TROWBRIDGE. [WILTSHIRE.]

TROY (Τροια, Τροιη, Τροία) is the name both of the country in which the city of Troy was situated and of the city itself. The country, more commonly called Troas or the Troad, formed the N.W. part of Mysia in Asia Minor. In after ages this tract preserved its name, and under the Romans it formed a separate district of Mysia. It was bounded on the W. and N.W. by the Ægean Sea and the Hellespont, the extent of its coast being from the promontory of Lectum on the south to the river Rhodius, which falls into the Hellespont below Abydos on the north. Its eastern boundary was a ridge of Mount Ida, extending from the source of the Rhodius, to the sea-coast near the promontory of Lectum. Strabo gives a much greater extent to the Troad, making it reach to the river Æsépus on the east, and to the Caïcus on the south (xiii., p. 581–586); but in taking this view, Strabo included as subjects of the king of Troy several states which were only his allies. (Homer, 'Iliad,' ii. 824, &c.)

The inhabitants of the Troad were probably of Thracian origin. At the time of the Trojan war they had reached a higher state of prosperity and civilization than the Achæans, their assailants. There seems, however, to have been no considerable town in the district except the capital. The whole of the Troad is intersected by the branches of Mount Ida.

The topography of Troy or Ilion, and of the Troad, is a subject on which much has been written. Those who wish to investigate it may refer to the works of Pococke, Le Chevalier, Choiseul Gouffier, Spon, Wood, Wheeler; Leake, *Travels in Asia Minor*, c. 6; Forchhammer, in the *Journal of the Geographical Society of London*, vol. xii., whose essay is accompanied by a topographical survey of the plain of Troy, by Captain Graves, T. A. B. Spratt, and other officers of the Royal British Navy; Von Eckenbrecher, 'Ueber die Lage des Homerischen Ilion,' in the *Rheinisches Museum fur Philologie*, p. 1–49, with two maps, one representing the ancient, and another the modern condition of the country; and the article 'Troy' in Dr. Smith's *Dictionary of Greek and Roman Geography*.

TROY. [NEW YORK.]

TROY WEIGHT. Neither the etymology nor the time of introduction of this denomination is well known; the received opinion is that it took its name from a weight used at the fair of Troyes. This is likely enough, since we find that the weights of more than one large commercial town became standards: thus we have the pound of Cologne, of Toulouse, and perhaps also of Troyes.

The troy pound is the legal standard, though only actually used in weighing precious metals and stones, and apothecaries' drugs. There is no doubt that it was originally the pound of silver, the pound sterling, and there is evidence that this pound was sometimes described as divided into twenty parts called sterling shillings. The famous statute of Henry I. (1266) makes a standard for it from the weight of ears of wheat.

The pound troy is now divided, for gold and silver, into twelve ounces, each ounce into twenty pennyweights, and each pennyweight into twenty-four grains. But for medicines, it is divided into twelve ounces, each ounce into eight drams or drachms, each drachm into three scruples, and each scruple into twenty grains. A cubic foot of water weighs 75·7374 pounds troy.

TROYES, the capital of the French department of Aube, is situated in the middle of a vast and fertile plain on the left bank of the Seine, which partly surrounds the town and supplies numerous canals that circulate in its interior, in 48° 18′ N. lat., 4° 4½′ E. long., 87 miles by railway S.E. from Paris. It has its civil and commercial tribunals, a chamber of commerce, a council of prud'hommes, a society of agriculture, science, and art, a diocesan seminary, a college, normal school, cabinet of natural history, museum, and 34,613 inhabitants. It occupies the site of the chief town of the Celtic *Tricasses*, which was named by the Romans *Augustobona*. On the decline of the Roman power, it was called Tricasses or Trecassæ, and later still Trecæ, from which the modern name has been derived. Attila, after his defeat by Aëtius in 441, retreated upon Troyes, which was saved from destruction by its bishop, St. Loup, who made a treaty with the barbarian, and accompanied his army as a safe-conduct to the Rhine. It was burnt by the Normans in 889, and in the feudal period was the capital of the important county of Champagne; was taken by the duke of Bourgogne in 1415; and here, in 1420, the marriage of Henry V. of England with Catherine of France was concluded, and the treaty arranged by which Henry was to succeed Charles VI. on the throne. Troyes was retaken from the English by Joan of Arc in 1429. In 1814 it was the scene of severe combats between the French and Russians.

The Seine flows on the northern and eastern sides of the town, which is entered by six gates, and surrounded by old ramparts planted with trees: the ditch is laid out as a garden. Many of the streets are narrow and crooked, but some have recently been widened and laid out in a superior manner. The houses, many of which are still of wood, are generally ill built; the gables towards the streets are painted or plastered, frequently adorned with coarse carving, and have dark penthouses, which overhang the shops; but these old structures are gradually giving way to well-built residences, and many quarters of the town have already assumed a handsome appearance. The cathedral of St.-Pierre, founded in 872, and rebuilt between the thirteenth and sixteenth centuries, is a fine specimen of Gothic architecture: the height and width of the nave, the splendid stained-glass windows which adorn the aisles, three beautiful rose windows, one of which is above the central door, and the handsome pavement of the choir, are among the features which attract the greatest notice. The building has never been completed: there were to have been two western towers, but one only, about 205 feet high, has been erected. The church of St.-Jean is remarkable for the narrowness of the nave: it contains a fine tabernacle sculptured by Girardon, and a painting of the baptism of Christ, by Mignard. St.-Remi contains a figure of Christ in bronze, by Girardon, which is regarded as one of the finest works of that sculptor. La Sainte-Madeleine and St.-Urbain are considered very beautiful, and St.-Nicolas has a handsome front. All the churches of Troyes are more or less rich in painted windows: those of St.-Nizier and St.-Pantaléon are in black and white; those of La Madeleine are equally beautiful for colouring and for design. The Hôtel-Dieu is a fine building of the last century; the town-hall has a handsome stone front, adorned with columns of black marble; the gate of St.-Jacques, which is flanked by two towers and surmounted by a light spire, is sometimes ascribed to Cæsar. Amongst the other buildings are the theatre, the episcopal palace, the wine-mart, the abattoirs, and the gaol and house of correction. The public library, which is formed in a great measure of the collections found in the suppressed monasteries, contains

100,000 volumes, besides 5000 MSS.; and is a spacious hall 164 feet long, 32 wide, and 22 high.

The manufactures of Troyes are important: the chief articles made are—all kinds of cotton and woollen goods, linen, printing paper, playing cards, chamois and other leather, gloves, hats, hosiery, wool-cards and combs, spinning-wheels, knitting-needles, agricultural implements, furniture, musical strings, leaden utensils and wares, and whiting. There are dye-houses, bleaching-grounds, tan-yards, and several printing-offices. The commerce in these various products, in corn, peas, beans, wine, brandy, colonial produce, hemp, wool, iron, lead, zinc, timber, &c., is greatly facilitated by the numerous good roads that intersect the town, by the canal of the Upper Seine, and especially by several lines of railroad.

An English standard measure (that used by goldsmiths and jewellers) is said to be derived from the town, and bears its name. [Troy Weight.] Troyes gives title to a bishop, whose see is the department of Aube. It is the native place of Pope Urban IV.

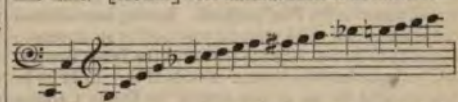
TRUCK SYSTEM. TRUCK ACT. The term Truck, which means exchange or barter, is now used to signify the payment of wages of labour in goods, and not in money. By the truck system is meant this mode of paying wages, together with all its tendencies and results. The Truck Act, 1 & 2 Will. IV. c. 36, 37, is an Act passed in 1831, which, repealing all the previous Acts passed for the same purpose, made stricter provisions for the prevention of payment of wages in truck in the departments of industry therein enumerated. The wages of agricultural labourers and domestic servants are exempted from the operation of the Act. The evidence published in the Report of the Select Committee of the House of Commons appointed in the session (1842), 'to inquire into the operation of the law which prohibits the payment of wages in goods, or otherwise than in the current coin of the realm, and into the alleged violations and defects of the existing enactments,' showed that, notwithstanding the Truck Act, the truck system was still in extensive operation in mills, factories, iron works, collieries, and stone quarries in the kingdom, and abundantly illustrated the evil tendencies of the system.

The chief part of the evil of what is called the truck system is incidental, and not essential to the payment of wages in truck, and arises out of the power of the master over the workman, which enables the master to use this mode of paying wages to defraud and oppress the workman. A master may pay the wages of his workmen wholly or in part in truck, in articles of food, clothing, &c., either by agreement, or with only the understood consent of his workmen; and if he supply these articles at prices no higher than those at which they are to be procured elsewhere, and study to meet the various wants of the workmen and their families, the utmost harm that can result is the loss to the workmen of the moral and economical lessons which the disbursement by themselves of weekly money wages is fitted to supply, and the interference with the business and profits of neighbouring retail shopkeepers; and there will always in such cases be some advantage to set against these, so far as they go, evil results. Where the truck system acts beneficially, it is owing entirely to the justice and benevolence of the individual truck-masters. On the character of the master everything depends. In the hands of masters of opposite character, and under circumstances, whether of scarcity of employment, of isolated situation, or of combination among masters in the same business, or through an extensive district, which place the workman more or less at the mercy of his employer, the payment of wages in truck may be, and continually has been, and is still extensively, used for the defrauding and oppressing of workmen.

TRUE. (Astronomy.) This word is used in a somewhat technical sense. The place which a star or planet appears to occupy in the heavens is not called its true place, but that which it would occupy if the effects of refraction, parallax, &c., were removed, that is, if the spectator saw from the centre of the earth, and without the light passing through any refracting medium.

TRUFFLE. [Tuberaceæ.]

TRUMPET, a musical instrument of the highest antiquity. It is a single tube 8 feet long, less in diameter than the horn, doubled up in a parabolic form, sounded by means of a mouthpiece, and subject to the same acoustical laws which govern all instruments of this class. [Horn.] Its natural scale is as follows:—



By the assistance of a small brass tube, called the tuning-pipe, or shank, by which the tube of the trumpet is lengthened, the above notes may be increased.

Music for the trumpet, as for the horn, is always written in the natural key of C, and the key to which the instrument is to be adapted is pointed out by the composer.

TRUMPET FISH (*Centriscus scolopax*), a species of spiny-finned fish belonging to the sub-order *Acanthoptera*, and family *Aulostomidæ*, or *Fistularidæ* of some authors. The various species of the family are popularly known as Sea Snipes, Bellows Fishes, Snipe-nosed Trumpet Fishes, &c. The characters of the genus *Centriscus* are—Snout produced; mouth small; teeth awanting; body compressed, oval, covered with scales; two dorsal fins, the rays of the first spinous; ventral fins united; abdomen carinated. The Trumpet Fish occurs occasionally on the British coast, and is not uncommon in the Mediterranean. The greatly elongated form of the snout, in which the jaw bones are developed into a tube, in some cases nearly 2 inches in front of the eyes, has obtained for this animal the name Trumpet or Snipe Fish. The mouth at the extremity of this tube is very small; the eyes large, irides silvery, streaked with red, the pupils black. The colour of the back is red, the sides rather lighter; the sides of the head and belly silvery, tinged with gold colour; the scales on the body hard, rough, minutely ciliated at the free edge. The Trumpet Fish spawns in spring. It prefers a muddy bottom, in moderately deep water. 'Its food,' says Yarrell, 'consists of minute crustaceous animals; and in reference to their tubular mouths, it is probable that by dilating their throat they can draw their food up their cylindrical beak, as water is drawn up the pipe of a syringe. The beak-like mouth is also well adapted for detaching minute animals from among the various sorts of sea-weed. The flesh of the Trumpet Fish is considered good.

TRUMPET FLOWER, the name of some handsome flowering shrubs of the genera *Bignonia*, *Tecoma*, *Catalpa*, *Brunsfelsia*, *Solandra*, &c., alluding to the long tubular corollas of the flowers.

TRUMPET WEED, the name of a sea-weed, *Ecklonia buccinalis*, belonging to the natural order *Laminariaceæ*, which abounds at the Cape of Good Hope. It has a stem 20 feet in length, crowned at the top by a fan-shaped cluster of fronds, about 10 to 12 feet long.

The hollow part of the upper portion of the stem is dried, and used as a siphon, or by the native herdsmen as a trumpet to 'call the cattle home' in the evening.

TRUMPETS, FEAST OF, a feast among the Jews which was held on the first and second days of the month Tisri, which was the commencement of the Jewish civil year. It derived its name from the blowing of trumpets in the temple with more than usual solemnity.

TRUNCATED, cut off, or abridged. Thus the part of a cone or pyramid which remains when the vertex and parts adjacent are separated from the rest by a plane section, is called a truncated cone or pyramid.

TRURO. [CORNWALL.]

TRURO, RIGHT HON. THOMAS WILDE, BARON, was the eldest son of Mr. T. Wilde, attorney, of College Hill, London, and born in July, 1782. He was educated at St. Paul's school. Having been articled to his father, for some years he practised as an attorney; but in 1817 he was called to the bar at the Inner Temple; and his practice soon became considerable. In 1820 he was engaged as one of the counsel for Queen Caroline on her trial in the House of Lords. In 1824 he became a serjeant-at-law; and in 1827, a king's counsel. He was returned as a member of Parliament in 1831 for the borough of Newark. In December, 1839, Mr. Wilde became solicitor-general, and received the honour of knighthood. In 1841 he was advanced to the position of attorney-general, and during the same year was returned as member for the city of Worcester. Under Lord John Russell's administration, in 1846, he was appointed Lord Chief Justice of the Common Pleas, and sworn a member of her Majesty's privy council. In 1850 he was made Lord Chancellor, and created a peer of the realm, by the title of Baron Truro, of Bowes Manor, Middlesex, which exalted office he filled up to February, 1852, when the earl of Derby succeeded to the head of the government. He died in November, 1855.

The name of Lord Truro is associated with many useful reforms in the administration of the laws. Among other things he appointed a commission to inquire into the jurisdiction, pleading, and practice of the Court of Chancery, and by his recommendation the services of the twelve masters were dispensed with, and a saving of 20,000*l.* per annum effected. The enormous fees of the Chancery Court and several useless offices were likewise abolished. Lord Truro was also instrumental in establishing the Court of Lords Justices, by which the judicial labours of the lord chancellor were materially relieved; and to him we owe the reform of the procedure in the courts of common law, a measure which has been fully appreciated by the public.

TRUSS. A truss of hay is half a hundredweight, and thirty-six trusses make a load.

TRUSSING. The rods or bars which are added to a girder for the purpose of trussing or supporting it may be applied in two sets, one on each side of the girder, and connected together by short cross-pieces at the necessary points; or the beam or girder itself may be divided longitudinally into two halves, or flitches, separated just so far as to admit a single truss between them, and held in the right position by the insertion of small blocks. One of the simplest methods of trussing girders is that in which the beam rests upon walls at its extremities, and has two inclined struts, resting on notches in the timber at the lower end, and supported at the centre or junction by a vertical kingpost, screwed by a nut beneath the beam. This form is improved by connecting the lower ends of the inclined bars by an iron rod stretching in a perfectly straight line, and capable of being brought to any required degree of tension by means of screws or keys.

Cast-iron beams are frequently trussed with wrought-iron rods, in a similar manner to those of wood, and are applied to purposes for which great strength is required. The bridge which supports the London and Blackwall Railway across the street called the Minories is a remarkable example. It has a clear span of 63 feet, and is supported by six massive trussed beams weighing about 15 tons each.

In shipbuilding *trussing* refers to diagonal timbers or iron plates, crossing the ribs internally, and consolidating the whole together. Iron is preferred to wood, as being less heavy and not so bulky.

TRUST AND TRUSTEE. A trust, which is in fact a new name given to a use, is defined by Lord Coke in the words employed by him for the definition of a use: 'A confidence reposed in some other, not issuing out of the land, but as a thing collateral, annexed in privity to the estate of the land, and to the person touching the land, for which *cestui que use* has no remedy but *by subpœna* in Chancery.' (Co. Litt., 272 b.) A trustee is he who undertakes to discharge a trust; and a *cestui que trust* is the person who is entitled to the benefit of a trust.

Owing to the settlements made upon marriage, and the dispositions of property made by will, a great amount of property is in the hands of persons who hold it in trust for certain purposes defined by the instruments which create the trusts. There are also trusts for charitable purposes and others. The law relating to trusts is accordingly implicated with the law of property, and it also contains the rules as to the duties and powers of trustees, both with reference to the *cestuis que trust* and other persons. The Court of Chancery has the sole jurisdiction in trusts. The Trustee Relief Acts, 10 & 11 Vict. c. 96, and 12 & 13 Vict. c. 74, were passed for the purpose of relieving trustees of the difficulty that sometimes arises as to whom the trust property really belongs. They can now, by paying the trust money into court, on petition obtain the Court of Chancery's directions.

Trusts may be created either by deed or by testament. The Roman Fidei commissum was only created by testament, and it was a testamentary disposition by which the testator gave something to one person, and imposed on him the duty of transferring it to another. It is stated that there were no legal means of compelling the discharge of this duty till the time of Augustus, who gave the consuls jurisdiction in Fidei commissa. Under Claudius prætors were appointed to exercise jurisdiction in Fidei commissa.

In Scotland trusts and the privileges and rights of trustees are regulated by the Scotch Act 1696, c. 25, 24 & 25 Vict. c. 84 (1861), amended by 26 & 27 Vict. c. 115 (1863). (*Law of Trusts and Trust Settlements*, by John M'Laren.)

TRUXILLO. [ESTREMADURA, *Spanish;* PERU.]

TSCHETWERT, or CHETWERT, a grain measure of Russia equal to 0·7218 imperial quarter, or three-fourths of a quarter nearly.

TSE-TSE (*Glossina morsitans*), a destructive species of fly discovered by the African explorer, Dr. Livingstone. It is about the size of the common house fly, but a little longer and blacker, and marked by transverse bars. In the districts where it occurs it is peculiarly fatal both to horses and oxen. Wild animals escape its attack. The Tse-tse is fortunately confined to particular districts, and

can thus, to some extent, be guarded against. 'The bite,' says Dr. Livingstone, 'of this poisonous insect is certain death to the ox, horse, or dog. In this journey, though we were not aware of any great number having at any time lighted on our cattle, we lost forty-three fine oxen by its bite. We watched the animals carefully, and believe that not a score of flies were ever upon them. The mule, ass, and goat enjoy the same immunity from the Tse-tse as man and the game. Many large tribes on the Zambesi can keep no domestic animals except the goat, in consequence of the scourge existing in their country. Our children were bitten, yet suffered no harm; and we saw around us numbers of zebras, buffaloes, pigs, pallahs, and other antelopes, feeding quietly in the very habitat of the fly. There is not so much difference in the nature of the horse and zebra, the buffalo and ox, the sheep and antelope, as to afford any satisfactory explanation of the phenomenon. Is not man as much a domestic animal as a dog? The disgust which the Tse-tse shows to animal excreta is turned to account by the doctors. They mix droppings of animals, human milk, and some medicines together, and smear the animals that are about to pass through an infected district. This, though a preventative at the time, is not a permanent protection.' The buzz of this fly is described by Livingstone as being so peculiar, that when once heard it can never be forgotten.

TUAM. [Galway.]

TUBER. [Stem.]

TUBERA'CEÆ, a section of the sub-order *Gasteromycetes*, of the natural order of *Fungi*. The species are not numerous, and are found very generally diffused throughout the temperate parts of the world, and growing buried beneath the soil. *T. cibarium*, the common Truffle, is known by its surface being warty and of a black colour. It is found buried in the soil of woods, sometimes at the depth of 10 or 12 inches or more. It is a native of Europe, and is also found in Japan and the East Indies. It grows abundantly in some parts of England, also in Italy and the south of France. This is one of the few species of the natural order *Fungi* that is used as an article of diet. For this purpose they appear to have been employed by the Greeks and Romans. *T. moschatum*, Musk-scented Truffle, has a roundish, smooth, blackish appearance, and is a much rarer plant than the last. It has been found in Great Britain, and is characterized by the musky odour which it gives out. The imports of Truffles into the United Kingdom in 1866 were 68,287 lbs., value 25,766*l.*; and the exports 1100 lbs., value 477*l.*

TUBEROSE. [Polyanthes Tuberosa.]

TUBI'COLÆ. The *Tubicoles* of Cuvier, commonly called by the French *Pinceaux de Mer*, form the first order of his Annelids.

The *Tubicoles* have branchiæ in the form of plumes, or of small arborizations, attached to the head or on the anterior part of the body, and nearly all inhabit tubes.

Of those which inhabit tubes, some form a calcareous homogeneous one, resulting probably from their transudation, like the shells of the Mollusca, but they do not adhere to it by means of muscles: others construct a tube by agglutinating grains of sand, fragments of shells, or particles of sand by means of a membrane which they doubtless transude also: there are others again whose tube is entirely membranous or horny.

To the first category belongs the genus *Serpula*, whose species are the *Tuyaux de Mer* of the French, and their twisting calcareous tubes cover stones, shells, and other submarine bodies. The section of these tubes is sometimes round and sometimes angular, according to the species.

Cuvier describes the animal as having a body composed of a great number of segments; its anterior part enlarged into a disc, armed on each side with many bundles of stiff bristle-like appendages, and on each side of the mouth a plume of branchiæ in the form of a fan, ordinarily tinted with vivid colours. At the base of each plume is a fleshy filament; and one of the two, that to the right or left indifferently, is always prolonged and dilated at its extremity into a disc of different configuration, which serves as an operculum, and closes the aperture of the tube when the animal retires within it. Cuvier further observes that the most common species having this disc in the form of a funnel, some naturalists have mistaken it for a proboscis: but it is not pierced; and the other species have it more or less of a club-shape.

The number of species of *Serpula* (Lam.) admitted into a recent edition of 'Animaux sans Vertèbres,' is sixty recent and fossil; and M. Milne-Edwards adds many more at the end of the genus; but he observes that very little is known of the specific differences presented by these animals, and that many of the living and all of the fossil species are characterized in a very doubtful manner. The fossils are said to be found in the tertiary, greensand, chalk (environs of Münster and Maastricht), lias, and oolite beds, &c. Mr. Lea describes a species, *Serpula ornata*, from the tertiary of Alabama (Claiborne beds).

Other genera are named *Sabella*, *Terebella*, *Amphitrite*, *Siphostoma*, *Spirorbis*, &c.

The following situations have been noticed as frequented by these annelids:—

Serpula (including *Vermilia* and *Galeolaria*, Lam.) may be said to be, generally, littoral, attached to rocks, stones, shells, crustaceans, corals, and other marine bodies.

Spirorbis is found on sea-weed, shells, &c., and nearly in the same situations.

Sabella occurs on the coasts, on shells, &c., and generally in shallow water.

Terebella haunts nearly the same localities.

TUBICO'LIDÆ. The *Tubicolées* of Lamarck form the first division of his *Conchifères Crassipèdes*; and he commences his *Conchifera* with *Aspergillum*, and terminates them with *Lingula*, the last genus, according to him, of the *Brachiopoda*.

Lamarck observes that the Tubicolidæ are undoubtedly conchifers, but of such great singularity, that some among them have been referred to other classes by modern naturalists; and he adds that it is singular to find a bivalve shell inclosed in a testaceous tube, and still more singular to see it incrusted in or built into the wall of that tube, and concurring to complete such wall.

The singularity of the Tubicolidæ, as well as that of the *Pholades*, has, he further remarks, caused a misconception of the real essentials of the shells which belong to the family, namely, two similar, equal, regular valves, articulated by a hinge. As in the shells of the Tubicolidæ, there are some which have accessory pieces apart from their valves; so, as one sees in the *Pholades*, some naturalists have taken them for multivalve shells, a notion which has given rise to very odd associations.

But, continues Lamarck, the doubts relative to the classification of the Tubicolidæ and to those similarities which they exhibit to the *Pholades* are evidently dissipated by the transitional characters which connect *Aspergillum* with *Clavagella*, these last to the *Fistulanæ*, and afterwards to the *Teredines*, which themselves approach the *Pholades*.

Finally, Lamarck points out that the animals of this family are borers, burrowing in stone, wood, and even in thick shells; but some, nevertheless, live in the sand.

The following six genera are arranged by Lamarck under this family:—*Aspergillum*, *Clavagella*, *Fistulana*, *Septaria*, *Teredina*, and *Teredo*.

TÜBINGEN, a walled city of Würtemberg, in the Black Forest, is situated on the left bank of the Neckar (over which there is a stone bridge) at its confluence with the Ammer, about 20 miles S. from Stuttgardt, and has 8700 inhabitants. The town is irregularly built in the old style, and lies on a slope. The most regular portions are the two suburbs, of which that built on the right bank of the Neckar is very pleasant. Tübingen is chiefly interesting on account of its university, founded in 1477, which occupies the ancient castle of the counts Palatine, and is governed by a chancellor, appointed by the king, and a senate. Among its earliest professors were Melanchthon and Reuchlin. It has faculties of medicine, jurisprudence, philosophy, Protestant and Catholic divinity, and political economy. There are forty-one professors in ordinary, who form the senate, and twelve extraordinary. Attached to it are a library of 150,000 volumes, a good collection of natural history, a cabinet of medals, a collection of mathematical, astronomical, and philosophical instruments, an observatory, and a botanic garden. The university is generally attended by about 700 students, and it has recently attained great notoriety in consequence of the extreme rationalistic views propounded by Professor Baur and others of the TÜBINGEN SCHOOL. Among the principal public edifices in the town, besides the university, are St. George's church; the town-hall, built in 1435; the Protestant seminary; the Catholic college; the museum; the court of justice; the city hospital, a very spacious building; and the infirmary and lying-in hospital. There are several printing-offices, gunpowder mills, an anatomical theatre, dye-houses, breweries, woollen-cloth factories, and many saw, fulling, and other mills on the Neckar and the Ammer, besides which the town has a good trade in agricultural produce, wine, and fruit.

TÜBINGEN SCHOOL, the name given to a new school of historico-philosophical theology, which has exercised, and must long continue to exercise, a potent influence on religious thought and biblical criticism. Its leading principle is a close and practical interpretation of the various portions of Holy Writ, and its leaders are Strauss, Baur, and Ziller. The 'Leben Jesus,' or 'Life of Jesus,' of the former, has been extensively read in England. The school owes its name to the fact that its writers are or have been connected with the celebrated university at TÜBINGEN, in Würtemberg, founded by Duke Eberhard in 1477, and rendered illustrious by the reputation of Reuchlin and Melanchthon. (Mackay, *The Tübingen School and its Antecedents.*)

TUBIPORES (Lat. *tubus* and *porus*; Gr. πόρος, 'a pore' or 'passage'), in Zoology, the name of a family of Zoophytes, comprehending those species in which the animals are completely isolated. They are contained in calcareous cells, of an elongated cylindrical form, attached by their base, and strengthened by transverse ribs or bars at certain fixed intervals.

TUBULAR BRIDGE, a bridge consisting of hollow girders so large that the traffic of the bridge passes through the interior of them. *Box-beams*, or small hollow beams of wrought iron of a four-sided form in cross-section, are of comparatively old date; and it is uncertain by whom they were first introduced. A great tubular girder is distinguished from a box-beam by requiring special contrivances for stiffening the iron plates which form its top, bottom, and sides.

The first invention of tubular bridges is due to Robert Stephenson, who in 1844 proposed a bridge of that kind for carrying the Chester and Holyhead Railway over the Menai Strait. His first proposal was to use a wrought-iron tube of elliptical section. Mr. William Fairbairn, who was conjoined with Stephenson as engineer of the proposed bridge, investigated by experiment the best form of girder for the purpose, and in consequence proposed the rectangular form, which was adopted; and he also invented the cellular structure for giving sufficient stiffness to the top, and to such parts of the bottom as may be subjected to a compressive strain. The cellular structure consists in having two layers of plate iron, with the space between them divided by longitudinal plate-iron partitions into 'cells,' or rectangular tubes, about 2 feet square. Mr. Eaton Hodgkinson co-operated in the experimental investigations. The first tubular bridge was erected in 1848: it was that which carries the Chester and Holyhead Railway over the river Conway in North Wales; its span is 400 feet; and it consists of a pair of parallel tubular girders, one for each line of rails. Then followed the Britannia Bridge over the Menai Strait, commenced in 1849 and opened in 1850; it also consists of a pair of parallel tubular girders, each 1511 feet long, which stretch continuously over four spans—two in the middle, of 460 feet each, and two at the ends, of 230 feet. The clear height above high water is 100 feet. Each girder was hoisted to its place in four divisions by means of great hydraulic presses; and then the divisions were connected over the piers so as to make the girders continuous.

In the Victoria Bridge, over the river St. Lawrence, at Montreal, in the railway bridge over the Nile, and in some other examples, Stephenson abandoned the cellular structure, and stiffened the tops of the girders partly by slightly arching them transversely, and partly by means of longitudinal iron ribs. The Victoria Bridge has twenty-five spans; the central span is 330 feet; each of the others 220 feet; it was finished in 1860.

The sides of a tubular girder are usually stiffened by means of vertical iron ribs, and the junctions of the sides with the top and bottom by iron gussets and brackets. An ordinary width for a tubular girder is 16 feet inside; and in some of the best examples the depth is about one-sixteenth part of the span. For further information, see Fairbairn on *Tubular Bridges*; Clark on the *Britannia and Conway Tubular Bridges*; Hodges on the *Victoria Bridge*; Rankine on *Civil Engineering*. As to the principles upon which the strength of tubular girders depends, see MATERIALS, STRENGTH OF.

TUBULIBRANCHIATA, an order of *Gastropods*, approximating to the *Pectinibranchiata*, and including the genera *Vermetus*, *Magilus*, and *Siliquaria*.

Vermetus.—The *Vermeti* have a tubular shell, the whorls of which, in the early age of the animal, form a kind of spire, but afterwards are prolonged into a tube more or less twisted or bent, like those of the tubes of *Serpulæ*. [TUBICOLÆ.] The shell is ordinarily fixed in an interlaced group of the same species, or partly enveloped in Lithophytes.

Magilus. [MAGILUS.]

Siliquaria.—Cuvier remarks that *Siliquaria* resembles *Vermetus* in the head, in the position of the operculum, and in the tubular irregular shell, which has, however, throughout its length a slit which follows all its wind-

ings, and which corresponds with a similar slit in the mantle which covers the branchial cavity. Along the whole length of this slit adheres a branchial comb, composed of a great quantity of foliations, distinct, and, as it were, tubular.

TUDOR. [HENRY VII.]

TUESDAY. [WEEK.]

TUFA, or TUFF, a rock formed of the accumulations of scoria and ashes about a volcanic crater, which are cemented together by the percolation of water charged with mineral matter, by pressure, or other cause, into a coherent or solid mass. Similar but more ancient aggregations of the products of heat, arranged into firm, solid, or even highly compact rock, are called Trap Tufa or Tuff.

TUFT-HUNTER. One who covets the society of titled persons, or one who is willing to submit to the insolence of the great for the sake of the supposed honour of being in their company. The term took its rise at the universities of Oxford and Cambridge, where the young noblemen wear a peculiarly formed cap with a tuft.

TUILERIES. [PARIS.]

TULA, a government of European Russia, situated nearly in its centre, between 52° 53′ and 54° 56′ N. lat., 35° 54′ and 38° 50′ E. long., is bounded N. by Moscow, E. by Riasan, S.E. by Tambow, S. by Orel, and W. by Kaluga. The area is 11,800 square miles, and the population 1,174,670. The surface is an undulating plain, where hardly anything is to be seen but boundless corn-fields or meadows, this province being one of the most populous and best cultivated in the empire. The soil, which is dry and generally poor, owes its fertility to skilful cultivation and a temperate climate. The chief crops are corn, beans, mustard, turnips, hemp, tobacco, and potatoes. There are no marsh lands, and forests are rare. Sheep, cattle, and horses are extensively reared. The principal river is the Oka, which is navigable throughout the district. The DON is little more than a brook during its short course in this government. No want of water, however, is experienced, there being above 200 small rivers, nearly all of them tributaries either of the Oka or the Don. Inferior coal is met with, and some iron mines are worked in the government, but the metal is not of very good quality. The inhabitants are Russians, with a few German families living among them, and are chiefly employed in agricultural pursuits, cattle-breeding, and fishing. The bishop of Tula and Bjelew is at the head of the clergy. Except in the chief towns there are no manufactures; the country people, however, make their own woollens and linen.

Tula, the capital, situated in 54° 15′ N. lat., 37° 25′ E. long., at the confluence of the Tulitza and the Upa, 110 miles S. of Moscow, is an important commercial and manufacturing town, with 57,705 inhabitants, a cathedral and thirty other churches, monasteries, a seminary and gymnasium, industrial museum, theatre, foundling hospital, and house of correction: there is likewise an institution, called the Alexandrium, for the education of children of noble families. The imperial manufactory of arms employs several thousand workmen, and provides nearly the whole of the Russian soldiers with weapons of excellent quality and good workmanship. The manufactory owed its origin to Peter the Great, but has risen to its present importance since 1817, through the efforts of an Englishman, Mr. Jones, of Birmingham. Tea urns, bells, locks, mathematical instruments, and cutlery of various kinds are also manufactured here. There are likewise in Tula numerous tanneries, distilleries, breweries, manufactories of Russia leather, candles, soap, tallow, beet-root sugar, woollens, linen, sealing-wax, paint, and Prussian blue. Bristles are prepared in large quantities, both for home consumption and export; and there is a considerable trade in corn and hemp.

Bjelew, situated on the Oka, in the western part of the government, is a large old town, with a rampart and moat, and 7650 inhabitants: it has fifteen churches, a convent, nunnery, seminary, and other public buildings. There are several tanneries, breweries, tallow-melting houses, and manufactories of hardware, especially knives. Altogether, the town has a very large trade for its size, and is the most important place in the government after the capital.

TULIP-TREE, the English name of the *Liriodendron tulipifera*, a tree belonging to the natural order *Magnoliaceæ*. In America, where it is a native, it is also known by the names of White Wood, Canoe Wood, Saddle-tree, Tulip-bearing Lily-tree, Virginian Poplar, and the Poplar. There is only one species of the genus, the *L. tulipifera*, which is a handsome tree. There are three varieties of this tree described. It is one of the most magnificent inhabitants of the forests of the temperate parts of North America. It abounds in the middle states of the Union, in the upper parts of the Carolinas and of Georgia, and is still more abundant in the western country, particularly Kentucky. These trees sometimes attain a height of 140 feet or more, and their trunks measure 20 feet in circumference. The most common dimensions, however, are from 70 to 100 feet in height, and from 18 inches to 3 feet the diameter of the trunk. The bark has a bitter aromatic taste, is a good tonic, and has been advantageously employed in intermittent fevers. The timber, which is easily wrought, takes a good polish, with a yellowish grain. The tree has been successfully introduced into England as an ornament for pleasure-grounds.

TULIP-WOOD, the striped rose-coloured wood of *Physocalymena floribunda*.

TU'LIPA, a genus of plants belonging to the natural order *Liliaceæ*. All the species are herbaceous plants, developed from a bulb. About thirty have been described.

T. sylvestris, the Wild Tulip, is the only species that is a native of Great Britain. In England it occurs in the counties of Norfolk, Suffolk, Hertfordshire, and Middlesex, in a chalk soil. It has also been found at Aberdour, in Fifeshire, Scotland, and in the southern parts of Germany, in Switzerland, Italy, and France. It has yellow flowers, and blooms in April and May. *T. Oculus Solis*, the Agen Tulip, found at Agen in France, grows wild in Italy, Germany, and other parts of Europe. The flowers are large and bell-shaped, of a fine scarlet-red colour, each petal marked with a broad black yellow-edged spot at its base. It blossoms in April and May. *T. suaveolens*, the Early Dwarf Tulip, is supposed to be a native of the south of Europe. It blooms in March and April. The flowers are of a scarlet colour, edged with yellow, and give out a sweet scent, for which this plant is more cultivated than on account of its colour or form. *T. celsiana*, Small Yellow Tulip, blossoms in March or April, and is a native of the south of Europe, and of the banks of the Volga. *T. clusiana*, Red and White Italian Tulip, was at one time supposed to be a Persian plant, but it has been found wild near Toulon in France, and also in Italy and Sicily. *T. biflora*, the Two-flowered Yellow Tulip, is a native of the salt deserts about the Volga, and is found in company with *T. celsiana*. It is not more than half the size of that plant, blossoms earlier,

and has less duration. The flowers are fragrant. *T. Gesneriana*, common Garden Tulip. Of all the species this one is the best known, and has perhaps had more attention bestowed upon it than any other plant that produces only flowers. It grows wild in the Levant, and appears to have been cultivated by the Turks in their gardens from an early period.

Though first introduced into France in 1611, it was in Holland that it was destined to make the greatest impression. In the early part of the seventeenth century the passion for the possession of tulips became so strong among the Dutch, that dealing in them became one of the most important money speculations, and the bulbs were sold and resold at enormous prices, in the same manner as stocks are on the Stock Exchange of England. It became in fact a gambling transaction, in which persons ventured their capital, in the hope that particular kinds of tulips would realize a higher price.

TULL, JETHRO, a gentleman of moderate fortune, who was born in or about the year 1680. He possessed a small estate near Hungerford, on the borders of Oxfordshire and Berkshire, where he zealously devoted himself to the improvement of agriculture. He has generally been considered as the father of the drill and horse-hoeing husbandry. Having observed the good effects of the cultivation of many plants in regular rows, and of frequently stirring the intervals between them, he concluded rashly that the earths very finely divided, together with moisture, constituted the whole of the food of plants, and that consequently stirring and pulverizing the soil was a complete substitute for manuring. He attempted to introduce this system into the field; and the first trials appeared to be so successful, that the New Husbandry, as it was called, was strongly recommended for general adoption. The error, however, was discovered in the end, and Tull, who had expended large sums in experiments, became so embarrassed that he lost his property, and it is said died in prison.

Tull published, in 1731, detached essays on his new mode of cultivation, which were in 1751 collected into one volume, with copious notes by himself. In 1822 Mr. Cobbett edited a new edition of his works.

TULLAMORE. [KING'S COUNTY.]

TULLOW. [CARLOW.]

TULLUS HOSTILIUS, the third king of Rome, reigned from B.C. 673 to 641. He is called a grandson of Hostus Hostilius, who fell in a battle against the Latins in the reign of Romulus. His reign is described as the very reverse of that of his predecessor, the pious and peaceable Numa, and he himself as even more warlike than Romulus. The most memorable event of his reign is the war with Alba, which is celebrated in ancient story on account of the single combat between the Horatii and Curiatii, and which was followed by the destruction of Alba. Its inhabitants were transferred to Rome, where the Cælian Hill was assigned to them as their habitation. Several of the noble Alban families were incorporated with the Roman patricians, and the number of Roman equites was likewise doubled, while the great mass of the Alban population were treated as an inferior race. A war now arose between the Romans and the Sabines, in which the latter were defeated near the Silva Malitiosa. But after these successful undertakings the gods afflicted Rome with a pestilence, which was preceded by several awful prodigies. The king, however, continued his warlike pursuits, until at last he was seized with the disease. In order to propitiate the gods, he consulted the 'Commentarii' of Numa, and found the formula with which that sovereign had performed his solemn sacrifices to Jupiter Elicius. He attempted to do the same, and to call down the god, but he committed a mistake in his use of the sacred formula, and the god in his anger destroyed the king and his whole house by lightning. This is the story of Tullus Hostilius as told by Livy.

TUMBREL, or TUMBRIL, a machine formerly used for the punishment of scolding women, consisted of a stool or chair attached to the end of a long pole, and mounted in such a manner that the chair, with the offender placed in it, might be swung over a pond, and immersed as often as might be necessary. The tumbrel was also used as a punishment for brewers and bakers who transgressed the laws relating to them; and acquired an infamous celebrity in France during the Reign of Terror, as the conveyance employed to carry criminals to the guillotine. The name is likewise applied to the covered carts used to carry tools, &c., in a train of artillery.

TUMOUR. It is not possible to define exactly the diseases which are commonly classed under the name of Tumours, and any definition in which the character of *swelling* (which is the true meaning of tumour) is included is unnatural: for there are several diseases which agree in the most important respects with some of those called tumours, but are not attended by any obvious enlargement or swelling of the part in which they are situated; and the same disease exists in some cases with and in others without swelling. The greater part of the diseases which have been classed as tumours are examples of a large class of what may be called morbid or parasitic growths—diseased structures, which are not mere alterations of previously existing parts, but new organisms or living substances which have grown within the tissues of the body by powers of development peculiar to themselves, and which depend upon the surrounding parts only for their supply of blood or other nutritive fluid. In this class are included all those diseases described as solid or sarcomatous tumours, and those which are closely related to some kinds of tumours, but are not accompanied by swelling, such as tubercle, certain forms of diffused cancerous growths, and some others.

The diseases called Encysted Tumours are entirely different from all others of the class in their pathological characters. [WEN.] The chief cancerous growths have been already noticed under their appropriate heading [CANCER]; and tuberculous growths under the name of the disease which is consequent on their development. [PHTHISIS.]

All morbid parasitic growths may be divided into *malignant* and *innocent*. The practical distinction between the two classes, from which they derive their names, is that an innocent growth or tumour is not likely to recur after being removed by operation; but a malignant growth is likely to recur in the same or some other part. Independently of the practical distinction, the most essential characters of malignant growths are —1, that they may occur in almost any part of the body, although some parts are more liable than others, and each kind of growth seems to find its most appropriate seat in a certain organ, as cancer in the breast, tubercle in the lungs, melanosis in the liver, &c.; 2, that they have a tendency to infect the adjacent parts, and to propagate themselves from one part to another, probably by germs carried from the primary disease into the blood, with which they circulate till they meet with an organ in a fit state to supply them with the means

of increase; 3, that they tend, through an intermediate process of softening (which appears to be consequent on the death of their constituent particles), towards ulceration; that this ulceration is of a kind which is at present incurable; and that in its progress it involves, almost without distinction of tissue, all the adjacent natural structures of the body, the particles of which, by their contact or combination with those of the malignant growth, seem first to assume a nature similar to that of the tumours, and then to perish with them; 4, that in general the minute structures of which they are composed are dissimilar to those of the natural organs of the body; and that their development does not proceed to the formation of any structure similar to the fully-developed tissues.

The distinctive characters of innocent growths are chiefly negative. They include most of those to which the name of Sarcoma is now commonly given. Their appearances are so various, that the most practised morbid anatomists frequently meet with examples which they cannot certainly refer to any described variety. They may be distributed into the kinds of Fatty Tumour, Cellular Tumour, Fibrous Tumour, Cartilaginous Tumour, and Osseous Tumour. There is no remedy for these but their removal. Not one of the medicines proposed for exciting their absorption is worthy of a trial. Of the means of removing them (when removal is possible), none is so safe, so expeditious, or productive of so little pain or inconvenience, as the knife; and whenever it can be employed, the sooner it is used the better; for, in general, delay will only increase the severity of the operation. For the operation itself, the only general rule is, that the whole of the diseased mass must be removed; any portion which is left will most probably become the nucleus of a similar growth. The particular proceedings must be varied according to the size, locality, and other circumstances of the tumour.

TU'MULUS (or *Barrow*), a Latin word, signifying a 'little hill.' Tumuli, or artificial mounds of earth, of various sizes and forms, are found in many parts of the globe, and are commonly supposed to be tombs, or sepulchral memorials of persons of distinction, or of warriors slain in battle.

The first careful investigations into the tumuli of this country were made by Dr. Stukeley in the neighbourhood of Stonehenge above a century ago. In the densely-peopled districts barrows have mostly disappeared; but in the counties of Wilts and Dorset, and parts of Hampshire, they are scattered over the open downs, and crown the more elevated ranges of hills which are yet untouched by the plough.

The remains found in the Wiltshire barrows are believed to indicate three distinct stages or eras of society. The first was before the introduction of metals, when arms and instruments consisted of spear-heads of flint, and arrow-heads of flint or bone; the second, when these articles were of brass; and the latest, when iron instruments, arms, and utensils accompany the deposit. Of the sepulchral urn, of which a great number have been found in the tumuli, there are two varieties, indicating different periods of mechanical art.

TUN. A quantity of wine consisting of two pipes or four hogsheads, or 252 gallons. [TON.]

TUNBRIDGE. [KENT.]

TUNBRIDGE WELLS. [KENT.]

TUNDRA, a name given to the vast plains in Siberia which border on the Arctic Ocean, and also stretch westwards from the Ural along the north of Europe. They are mossy, rush-grown levels, swampy in summer, hard bound with ice and snow in winter, and have been called 'the types of everlasting rest,' from the invariable sameness of their seasonal features, and the impossibility of altering them by introducing cultivation. The tundras are inhabited by wandering hordes of Samoyedes, who, by the help of the reindeer, capture great numbers of furred animals and wild geese.

TUNE, in Music, a short *Air* or *Melody*, with both or either of which terms it is synonymous.

TUNGSTATES, compounds of tungstic acid. Muslin and similar materials, by being soaked in tungstate of soda, are rendered almost incombustible.

TUNGSTEN (symb. W, equiv. 92), a metal first obtained in a perfect state by M. D'Elhuyart, in 1781. The name is formed of the Swedish words, *tung sten*, 'heavy stone.' It has a grayish-white colour and considerable lustre. It is brittle, and nearly as hard as steel. Its specific gravity is 17·4, and with the exception of platina, gold, and iridium, it is the heaviest known metal. It requires a very high temperature for fusion, and is not altered by exposure to the air. When heated to redness in the open air it takes fire, combines with oxygen, and is converted into tungstic acid, and nitric acid produces the same effect upon it.

The chief minerals which contain tungsten are *Tungstic Acid*, or *Scheelic Acid*; *Tungstate of Lime*; *Wolfram*, or *Tungstate of Iron and Magnesia*; and *Tungstate of Lead*.

Tungsten combines with several of the simple substances. *Tungsten* and *Oxygen* form an oxide (W O), which is black and insoluble; when heated to redness it suddenly ignites and is converted into tungstic acid, by absorbing oxygen during combustion. *Tungstic Acid* ($W O^3$) is pulverulent, of a yellow colour, insoluble in water, but readily dissolved by the caustic alkalies, forming with them salts called *Tungstates*. *Chlorine* and *Tungsten* form two compounds; of which the principal is the *bichloride* ($W Cl^2$), which has sometimes the form of delicate red needles, but more commonly that of a deep red fused mass resembling cinnabar in fracture. *Sulphur* and *Tungsten* form a sulphuret, or perhaps two compounds; they are, however, but imperfectly known.

The tungstates of ammonia, potash, and soda, are all soluble and crystallizable compounds; while those of lime, barytes, and strontia are insoluble.

TUNICARIES (Lat. *tunica*), the name of a class of Acephalous Molluscs, including those whose exterior covering is soft, elastic, and uncalcified. The modern classification, equivalent to the *Ascidies* of Savigny, and the *Acephales sans Coquilles* of Cuvier, is as follows:—

Order: *Sacchobranchiata*. Families: *Ascidiadæ*, *Botryllidæ*, *Clavellinæ*, *Peloniadæ*, *Pyrosomidæ*.

Order: *Tæniobranchiata*. Family: *Salpidæ*.

TUNICATA, *Les Acéphales sans Coquilles*, are thus characterized by Cuvier: — Their branchiæ assume different forms, but are never divided into four leaflets. The shell is represented by a cartilaginous substance, sometimes so thin as to be flexible like a membrane.

He divides them into two families, the first, *Les Biphores*, comprehending the genera of which the individuals are isolated and without organic connection one with another, although they often live aggregated. Genera—*Thalia*, Brown; *Salpa* and *Dagysa*, Gm.; *Ascidia*, Linn.

The second family, *Les Aggrégés*, comprehends animals more or less analogous to the *Ascidians*, but united in a common mass, so that they appear to com-

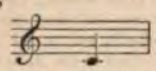
municate organically together, and under this character would seem to link the molluscs to the zoophytes; but what, independently of their peculiar organization, opposes his idea is, as MM. Audouin and Milne-Edwards have observed, that the individuals live and swim at first separate, and only coalesce at a certain epoch of their life. Their branchiæ form, as in the Ascidians, a large sac, which the aliments must traverse; the principal nervous ganglion also is between the mouth and the intestinal termination, and the disposition of the viscera is nearly similar. Genera, *Botryllus pyrosoma*. The following genera are fixed upon other bodies:—*Aplidium*, *Chelyosoma*, *Diazona*, *Didemnum*, *Polyclinum*, &c.

[Ascidia; Bipapillaria; Boltenia; Botryllus; Cynthia; Cystingia; Synoicum.]

TUNING, the art of adjusting the several sounds of a musical instrument so as to make its scale approach to correctness; also that of putting two instruments, each of which has the parts of its scale in proper relative adjustment, into agreement with each other.

Some musical instruments have a permanent relative scale, all the parts of which, if changed at all, change together. Thus a horn or a flute may change its pitch from the heat of a room, but all the parts change together, and the whole effect of the temperature is corrected at once by lengthening the pipe of which the instrument consists. Other instruments require to have the parts of their scales compared with each other from time to time, owing to their several parts being unconnected, and subject to unequal wear or to separate accident: such as the organ and pianoforte. Others again are so liable to these derangements as to require tuning every time they are used, as the violin class, the harp, drums, &c.

A *perfect scale* is impossible; that is to say, one in which all the intervals, or even all the principal intervals, in every key, shall be perfect. Let additional notes be introduced to make existing keys perfect, and those additional notes would themselves become the key-notes of new keys, requiring additional notes to make *them* perfect. Again, the conditions of the ordinary musical instruments require that the octave shall consist of only twelve semitones, and though some organs have been constructed with more, it is not worth while to embarrass the subject by treating of any other scale than that of the twelve semitones. We shall use the same notation as in the article Scale, expressing the following note of the treble scale,



by C, we shall denote the successive Cs in ascent by C^1, C^2, &c., and those in descent by C_1, C_2, &c.: thus C_3 is three octaves below C, and C^4 is four octaves above it.

The first point is to fix upon some one note, by the pitch of which all others may be determined. The only way of retaining a permanent pitch for use is by having an instrument which time will not alter. A standard pitch is usually obtained, or professed to be obtained, by the tuning-fork, an instrument consisting of two steel prongs growing out of a steel handle. When these prongs are sharply struck they vibrate, and if the instrument be then held to the ear, or placed upon the flap of a table, or any other sound-board, a low and very pure sound is heard, if the prongs be perfectly equal. These tuning-forks are usually made to sound either C major or A minor, the former being used for pianofortes, and the latter for violins, &c., and they would answer their purpose exceedingly well if there really were in existence any standard from which they were made. But there is not; and the consequence is, that not only do the tuning-forks of different makers frequently vary a little from each other, but the new forks are sensibly higher than the old ones.

The leading note being settled, the tuner must learn to tune that note in perfect unison with his fork, and then to tune the octaves of that note both above and below. This seems to be the most plain and straightforward part of the whole operation: nevertheless, easily as tuners take it, and readily as they refer to one of their octaves, as being as good an authority as the original note itself, we cannot help thinking that more pains than is usually taken might be well bestowed. A note and its octave, when the consonance is perfectly well tuned, should sound like one note: now considering that in a grand piano there are six strings to be tuned before an octave is ready, three unisons with the lower note and three with the upper, it is not so very easy to present that perfectly indivisible effect which a good artist ought to strive for. There is a method (given in Jousse's works) of tuning the twelve semitones of one octave-interval first, without tuning the octave of any note, by proceeding upwards by fifths and downwards by fourths, until the whole is completed, and this purposely to avoid depending upon notes in the adjacent octaves. This mode, however, or any other, must be matter of individual selection: it cannot be supposed that any one method would be best suited to all ears.

Those who are acquainted with the mathematical theory of the scale know that all the concords cannot be made perfect: others may learn it in the following way:—Suppose twelve perfect fifths to be tuned upwards from C, and give the results the names of the notes which they would represent in the scale of twelve semitones, and in the nomenclature of sharps, if the scale were perfect. We should then have

C, G, D^1, A^1, E^2, B^2, $F^3\sharp$, $C^4\sharp$, $G^4\sharp$, $D^5\sharp$, $A^5\sharp$, $E^6\sharp$, $B^6\sharp$.

Now since $B^6\sharp$ is the same note as C^7, it appears that twelve perfect fifths should be the same as seven octaves; and if we pass to the octave below, as soon as we get out of the octave beginning with C, we should have C, G, D, A, E, &c., the last being C^1. It will be found, however, that this is not true, but that the note obtained from twelve ascents by fifths intermixed with six descents by octaves is sharper than C^1. Again, if the perfect thirds be tuned from C, we should have C, E, $G\sharp$, C^1, but it will be found that C^1 obtained in this way is too flat. The octave derived from the fifths vibrates 223 times where it should vibrate 220; and that derived from the thirds vibrates 125 times where it should vibrate 128. The slight alterations which are made in order that any one of the twelve notes of the octave may be fit to be used as a key-note, without any shock to the ear, constitute the *temperament* of a scale; the altered consonances are said to be *tempered*. Some writers call the interval from the false octave, obtained by the fifths to the true one, by the name of the *wolf*.

Two systems of temperament suggest themselves—the first, *equal*, in which the necessary defects of the scale are distributed equally throughout it; the second, *unequal*, in which some mode is adopted of distributing the imperfection so as to make some keys feel it less than others. The most common practice of our day is to endeavour at equal temperament. The two systems have their advocates, and the arguments for one and the other are as follows:—In favour of equal temperament it is urged that all the keys are made equally

good, and that in no one does the imperfection amount to a striking defect: also that in the orchestra there is little chance of any uniform temperament among the various instruments, if it be not this one. Against equal temperament it is urged that it takes away all distinctive character from the different keys, and leaves no one single key perfect. All these arguments have force, both for and against: for ourselves, we consider those against equal temperament much the stronger. We have often felt that a pianoforte newly tuned has, with much correctness, a certain insipidity, which wears off as the effect of the tuning gradually disappears; insomuch that the best phase of the instrument, to our ears, is exhibited during the period which precedes its becoming offensively out of tune. At this time the progress towards the state of being out of tune (for which there is no single word, *maltonation* would do very well) can only be called a change of temperament; and the several keys begin to exhibit varieties of character which, until maltonation arrives, render the instrument more and more agreeable. But it must be remarked with respect to equal temperament, that it cannot be obtained in the ordinary way of tuning. The only way of obtaining a given temperament, equal or unequal, with certainty, is to take a monochord, and having calculated the proper lengths of the different strings, to form the successive notes on the monochord, and to tune the several notes of the instrument in unison with them. No tuner can get an equal temperament by trial: so that the question lies between the having all sorts of approximations to equal temperament, according to the propensities of different ears, or as many sorts of approximations to some other systems.

The mode of proceeding by approximation to equal temperament is simply to tune the fifths a little too flat, and the following order of proceeding is the most usual, and has often been given. The first letter represents the note already tuned, the second the one which is to be tuned from it: a chord interposed in parentheses represents the trial that should be made upon notes already in tune, in order to test the success of the operation as far as it has gone. The first step is to put c^1 in tune by the tuning-fork:—

c^1; c^1c; cG; GG_1; G_1D; DA; AA_1; A_1E; (EG); EB; (EG, DB); BB_1; $B_1F\sharp$; (DF$\sharp$A); F$\sharp$$F_1\sharp$; $F_1C\sharp$; (A_1C$\sharp$E); C$\sharp$G$\sharp$; (EG$\sharp$B); C^1F; (FAC^1); FA$\sharp$; (A_1A$\sharp$DF); A_1A$\sharp$; A$\sharp$D$\sharp$; (D$\sharp$GA$\sharp$); D$\sharp$$G_1\sharp$; ($G_1CD\sharp$).

We have written all the semitones as sharps, whether tuned from above or from below. Of course, since the fifths are all to be a little too small in their intervals, the upper note must be flattened when tuned from below, and the lower note sharpened when tuned from above. In the preceding the octave cc^1 is completely tuned, and also the adjacent interval $F_1\sharp C$. The rest of the instrument is then to be tuned by octaves. The thirds should all come out a little sharper than perfect, as the several trials are made: when this does not happen, some of the preceding fifths are not equal. The parts which are first tuned by the fifths, and from which all the others are tuned by octaves, are called *bearings*.

TUNING-FORK. [TUNING.]

TUNIS, a beylik or regency of the Ottoman empire, is situated in the central part of the northern coast of Africa. It is bounded on the N. and E. by the Mediterranean Sea, on the W. by Algeria, and on the S. and S.E. by the Sahara and Tripoli. Its greatest extent from N. to S., where the boundary line is very undefined, is about 450 miles, while its breadth from W. to E. varies from 65 to 180 miles. The area is about 78,000 square miles, and the population is estimated at nearly 1,000,000. It is the most important of all the countries of northern Africa, not only on account of its position, but for the ports it possesses on a coast measuring in a sailing line about 400 miles.

The part of the northern coast from the boundary line of Tunis and Algiers to Ras Sidi Ali-el-Mekki, or Cape Farina, is rocky and elevated. In the Bay of Tunis, from Ras Sidi Ali-el-Mekki to Ras Ghamart, it is low and generally swampy. Crossing Zembræ, Cape Bon (Ras Addar), the Promontorium Mercurii of the ancients, forms the eastern extremity of the gulf. From Ras Mustapha to Ras-el-Mahmoor the coast is low and generally swampy; and from that point to Hammamet, low and rocky. This is followed by a low sandy shore, which occupies the interior of the Bay of Hammamet, and terminates near Susa. Passing the modern town of Mistir, or Monastir, Cape Demas, the southern limit of the Gulf of Hammamet is arrived at. Mahadeah, called Turris Hannibalis by the ancients, stands on a point of land about 9 miles to the south. About 21 miles farther to the south opens the Gulf of Cabes, or the Little Syrtis, the shores of which are very little above the sea-level; and in general sandy rocks or cliffs of small extent are only found in a few places. The gulf is not more than 75 miles in extent from its northern to its southern point, and it penetrates into the mainland about 60 miles.

The north-western portion of Tunis, or that which is inclosed by the boundary line of Algiers on the west, the valley of the Majerdah River on the south and east, and the Mediterranean on the north, is very mountainous. It contains the ranges of the Frigean and Mogody mountains, many of which rise to a height of 5000 feet. Their slopes are generally fertile. Near the latter range is Lake Benzart, which is 28 miles long by 14 broad, and connected with the sea by a channel 10 miles long. The river Majerdah—the 'Bagrada' of the ancients—rises within the territories of Algiers, where it is formed by the junction of the waters of the Wady Serrat and the Wady Khamees: it runs for the most part through a shallow basin of moderate fertility. An uninterrupted tract of elevated ground traverses the country in a diagonal line between 35° and 37° N. lat., beginning on the south-west on the boundary line of Algiers, and terminating on the north-east in the peninsula of Dakhul and Ras Addar; it has several high summits, covered with forests. Between this high ground and the river Majerdah lies the plain of Tunis, which extends 20 miles on the north and west sides of the town, and to double that distance towards the south; it has a few ranges of hills, and a poor but well-cultivated soil. The Dakhul, or the peninsula which lies east of the Bay of Tunis, is occupied by a mountain range which extends from Jebel Zaghwan to Ras Addar. In it occur two deep depressions of inconsiderable width, through which roads are carried. A narrow level tract on the east side of the Dakhul is noted for its fertility.

Most of the inhabitants in the parts of Tunis already mentioned are engaged in cultivating the ground, in rearing cattle, and attending to the dairy. Notwithstanding the backward state of agriculture, wheat, barley, maize, tobacco, dhurra, pulse, olives (from which large quantities of oil are extracted), oranges, figs, grapes, pomegranates, almonds, and dates, are produced in abundance. Cotton and indigo have been recently introduced as articles of culture, and some saffron and

opium are raised. The sheep are noted for their wool, and the cattle, horses, and dromedaries are of fine breeds. The mineral products are salt and saltpetre, lead ore, copper, silver, and quicksilver. The lion, panther, ounce, lynx, wolf, and wild boar, are the principal ferocious animals that inhabit the western parts of Tunis; for to the eastward of the meridian of Tabarca the forests cease, and the country is less woody.

The region which is separated on the north from the upper valley of the Majerdah by the Al Kaff mountains, consists of an alternation of hills and plains of considerable extent. To the east of this lies the plain of Kerwan. Nearly in the middle of this table-land, which is more than 100 miles in length and about 30 miles in width, is the town from which its name is derived. The plain is separated from the sea by hilly tracts, which extend from Susa southward to a point opposite the islands of Karkenah. This tract is about 24 miles in width in the widest part, and contains a few spots of great fertility. The district which lies to the south of the three last-mentioned regions, and which contains the larger part of the country called by the ancients Byzacium, once noted for its fertility, is at present almost a desert, of which very little is known to Europeans. The southern portion of Tunis is called the Jerid, or Beled-el-Jerid ('the country of palm-trees'). It extends from about 34° N. lat. southward to the parallel of the southern extremity of the great salt lake Al Sibhah, and is contiguous to the Sahara. This lake is 70 miles long from south-west to north-east, and about 26 miles wide on an average. In winter it is covered with water to the depth of 2 or 3 feet, but at other times most of it is a dry plain, the surface being entirely covered with a thick salt incrustation. The country which extends from its eastern shores to the Gulf of Cabes consists of a succession of hills. It contains a great number of springs and small watercourses, to which circumstance its fertility is owing: fruits and garden vegetables are here cultivated in great abundance. Near the boundary line of Tripoli is the island of *Gerba*, about 18 miles long by 9 wide; it has four small ports or landing places, a fertile soil, and a dense population.

The atmosphere of Tunis is generally pure and wholesome. The plague is not endemic or periodical, and is only known when introduced from other parts. In all other respects the climate and seasons resemble those of TRIPOLI. The summer heats are moderated by sea-breezes along the coast, and the winters resemble the English spring. During the summer and autumn rain is very rare: it usually falls in November, and continues at intervals until the month of April. There are several mineral springs in the country. Flies, noxious vermin, mosquitoes, gnats, ants, and the scorpion, are everywhere the torment of Europeans.

Government.—The ruler of the territory of Tunis bears the title of bey. He is tributary to the sultan, who, however, has little control over him, for he is treated as an independent prince, and the sovereign of the country, with whom the states of Europe enter into treaties on matters international and commercial. His power is despotic; for the divan is only formally assembled to confirm the will of its master. The kingdom is not divided into provinces governed by separate chiefs, but is under the direct control of the bey himself, whose power is consequently the more consolidated, and no one ever thinks of opposing it. The bey is the chief of the religion of the state in Tunis, and is himself the first judge in the kingdom. He sits in the hall of justice almost daily, and his decisions, which are summary, are immediately put into execution. The naïbs administer justice in the same manner in the interior towns. The kadis judge only in matters of religion. The three latest rulers, Achmet, Mohammed, and Mohammed Sadyk Bey, the last of whom ascended the throne in 1859, have been enlightened sovereigns, and have introduced many reforms, foremost amongst which are the abolition of slavery, and the introduction of a system of taxation somewhat in accordance with justice and common sense. Much political liberty has also been accorded to the people at large. The state religion is Mohammedanism.

Commerce.—The foreign commerce of Tunis is the most considerable of all the Barbary states. It is not confined to the capital, but is also carried on briskly from the ports of the eastern coast. Among the manufactures exported are soap, morocco leather, red caps, and shawls. Wheat and barley, as well as the inferior grains, olive oil, wool, hides, bees'-wax, dates, almonds, and sponges, are the principal articles of produce shipped. Those received from the interior of Africa, and afterwards exported, are—ivory, gold-dust, ostrich feathers, senna, gums, and madder-roots. The imports are woollen cloths, cotton prints, calicoes, muslins, coarse linens, damasks, raw and wrought silks, fine wool, gold and silver tissues, coffee, sugar, spices, iron, tin, lead, hardware, cutlery, arms of all sorts, earthenware, paper, wine, spirits, and tobacco. As ports of loading, those of Sfax and Susa are preferred to Tunis, in consequence of the distance and delay of transporting merchandise in lighters across the lake to the Goletta, where ships generally lie; the commerce of the country is consequently best carried on in vessels less than 150 tons burthen.

In 1865 the exports from Tunis to the United Kingdom were valued at 5492*l.*, consisting principally of olive oil. The imports from Great Britain in the same year amounted to 106,479*l.*, two-thirds of which refer to cotton goods. There were no exports in 1866: the imports in that year were valued at 77,488*l.* The trade with central Africa passes through Gadamis. The caravans arrive at Tozer, Cabes, and Sfax about twice in the year, and barter their merchandise, which is thence introduced in various directions into Tunis.

Towns.—The territory of Tunis contains a great number of ancient towns, whose ruins lie scattered over the whole country, and now stand in the midst of these vast solitudes, some of them totally uninhabited, except by the lion, the wolf, and other ferocious animals, unless when the Arabs occasionally pitch their tents on their sites.

The next city in rank and importance after the capital is *Cairoan*, or *Kairwan*, which is 80 miles S.S.E. of Tunis, and contains a population estimated at 50,000. It stands in a sandy plain, is surrounded by a wall, and has a citadel, several mosques, and numerous remains of antiquity. In the eighth and ninth centuries this town was the capital of the Arab dominions in Africa, and the great mosque, which is supported by many marble or granite pillars, is esteemed the most sacred, as well as the most magnificent, in all Barbary. Morocco leather boots and slippers are manufactured here. *Kaff* is the third city in riches and strength, and is the key of Tunis on the western frontier; its walls are kept in good repair, and the fortress mounts about 130 pieces of cannon.

The towns and villages are more numerous and the population is greater in the northern parts of the state near the capital, but none of them are of sufficient importance to require a separate notice. The Dakhul, besides being an agricultural district, abounds in game,

is the seat of a large fishery, and has several small rivers running into the sea, which fertilize the country.

Inhabitants.—The Tunisines in general, like the Algerines, are a mixed race of Turks, Moors, and Jews, in the towns, interspersed with a few Christians and renegades; while the people of the country are Arabs or Kabyles of different tribes. The houses of the rich Moors, although of ordinary appearance without, are handsomely decorated within; their furniture consists of few articles, such as carpets, mattresses, and cushions, which are often made of rich silks and embroidery. The Bedouin Arabs, who are the inhabitants of the level country, are perpetually wandering from place to place. The Kabyles live in the mountains, and form little villages of hovels made of hurdles and mud, or of clay and stones hardened by the heat of the sun.

Antiquities.—The ancient sites on the banks of the Majerdah abound in ruins, particularly at Dukhah (the ancient Thugga), consisting of temples, an arch, a number of cisterns, baths, barracks, gates, theatres, an aqueduct, and many inscriptions. At Ayedrah is a handsome triumphal arch dedicated to the Emperor Septimius Severus, and columns of various beautiful marbles. At Kaff (Sicca), which, like Ayedrah, is on the western frontier, is still to be seen a paved street like those of Pompeii, and here likewise capitals, columns, and friezes are numerous. But the most stupendous monument of ancient times is on the site of Tysdrus, now called El Jem, where there is an amphitheatre, which Shaw refers to the reign of the Gordians. This is one of the most perfect, vast, and beautiful remains of former times that is known to exist. Its extreme length measures 429 feet and its breadth 368; and it is only surpassed in magnitude by those of Rome and Verona. It is nearly in a complete state of preservation, with its seats, arena, and entrances, and retains almost the freshness of a modern erection. The great aqueduct which conveyed water to Carthage, 52 miles in length, may yet be traced by masses of stone and cement. In 1837, on the site of Carthage, was discovered a Roman villa near the sea-shore, buried 15 feet under ground. Eight large rooms were completely cleared. The walls were painted, and the floors were beautifully paved in mosaic. In another house still more beautiful mosaics were found, representing gladiators contending with wild beasts, horse-races, and men breaking in young horses.

History.—The earlier annals of Tunis correspond with those of ancient CARTHAGE. Like the rest of Barbary it was subjugated by the Romans in the time of Julius Cæsar, and continued a Roman possession until overrun by Genseric and his Vandals, about 439. It was recovered by the Emperor Justinian, and remained a Roman fief until conquered by the Saracens. In 1575 it was subdued by Sinan Pasha, and incorporated in the Turkish empire. Its administration was then intrusted to a Turkish pasha, assisted or controlled by a divan or council, composed of the officers of the garrison and the commander of the Janissaries.

Early in the seventeenth century the soldiery rebelled and established a new military government, which in due time gave way to the usurped power of an officer with the title of Bey, whose original duties seem to have been purely financial. Murad Bey made the sovereignty hereditary, and it was enjoyed by his family for upwards of 100 years. In the eighteenth century it became subject to Algiers, but about 1720 Hamula Pasha succeeded in re-establishing its independence. He was a man of great capacity, vigour, and administrative ability, who organized a native Tunisian army, remodelled the internal government, placed the finances on a safe basis, and virtually secured the independence of his country. Of late years the history of Tunis has been undistinguished by any remarkable events, except the suppression of the slave trade, and under the rule of a liberal and enlightened government it has attained a position of conspicuous prosperity.

The present ruler is Mohammed Sadyk Bey, who succeeded his father Mohammed Bey in 1859.

TUNIS, a large and flourishing city and port, the capital of the above state, is situated on the west side of a small lagoon connected by the Goletta, a narrow strait, with the Bay of Tunis, about 3 miles from the ruins of ancient Carthage. It is at the edge of a large and beautiful plain, bounded in the distance by lofty mountains. The city is encircled by a high wall with six gates, around which is another wall, encompassing the suburbs, having eleven gates or passes into the country, and measuring about 5 miles in circumference. The town is also defended by a strong castle, completely commanding the narrow strait above mentioned, and by several detached forts in other directions. Tunis contains about 200,000 inhabitants, of whom 30,000 are said to be Jews. No place enjoys by nature more abundance of the necessaries of life. But the streets are narrow, irregular, and filthy in the extreme, becoming after a few hours' rain a perfect marsh, and in summer still more intolerable from their dust, rubbish, and vermin, and from the effluvia of the open drains. There are five principal and many smaller mosques, some of them being very magnificent, especially that of Jussuf, which has handsome marble pillars, brought at immense expense from ruins in the interior of the country. The houses in general are only one story high, with a court in the centre, and usually without windows to the street. In the middle of the city is an open space of no great extent, surrounded by well-supplied shops for the sale of manufactures. The bey's town palace is a modern building, but in the Saracenic style; and although situated in a narrow street is a very handsome edifice, with marble courts and galleries. Queen Caroline of England lodged in it during her visit to Tunis. There are extensive barracks, a theatre, and a few other public buildings. About 1½ mile from the city is the Bardo or summer residence of the bey. It resembles a little fortified town, and has a population of about 4000 persons, employed in some way or other about the court.

The chief manufactures of this city are silks, woollens, embroidery, leather, soap, wax, earthenware, olive oil, and several celebrated essences, all of which are exported, together with grain, fruits, cattle, fish, ivory, gold-dust, coral, &c. In carrying on this trade, notwithstanding the admirable situation of the town, considerable disadvantages are experienced. The depth of water within the lagoon is not more than 6 or 7 feet, and hence even merchant vessels are obliged to lie outside the Goletta, and can only load or unload by means of lighters. The place of anchorage, however, formed by an inner bay off that of Tunis, has in its centre a depth of from 10 to 20 fathoms, and is so capacious, that the largest fleet may ride in it with perfect shelter from all winds, except those from the N.E. The town presents considerable bustle. From sunrise to sunset, when the Moors retire to rest, the streets are filled with people.

Besides the mosques of the Mohammedans, the Jews have their synagogues, and the Greeks and Roman Catholics have several places of worship.

TUNNELLING, the operation of excavating a pas-

sage underground to carry a road, canal, railway, or aqueduct. Several tunnels were executed by the Roman architects, chiefly for military purposes, or for the conveyance of pure water to the great cities. During the middle ages few, if any, works of this kind were undertaken. In England they were revived by Brindley (in 1760) and Telford, but until their construction received an impetus at the railway epoch, the most famous was that which Sir Isambard Brunel, at great cost, and after conquering a series of formidable engineering difficulties, carried under the river Thames, from Rotherhithe to Wapping (1843), and which is now occupied by the projected East London Railway.

At the present time there are upwards of 80 miles of railway tunnels in Great Britain, and Mr. Fowler computes that they have cost about 6,500,000*l.*, at the average of 45*l.* a yard. The tunnel at Liverpool was completed in 1829, and being regarded as an engineering marvel was lit up with gas, and exhibited to the public once a week. Between London and Birmingham eight tunnels occur, their total length being 7336 yards. The South-Eastern Railway is carried from Higham to Rochester in Kent, a distance of upwards of 2 miles, through a tunnel in the chalk, formerly occupied by the Thames and Medway Canal. There are several tunnels on the London and South-Coast line, the two longest occurring at Merstham and Clayton. The Metropolitan Railway, in London, between Paddington and Victoria Street, runs, for the greater part of its length, underground. In 1857 M. Thomé de Gamood proposed to construct a submarine tunnel between France and England, the two termini being at Dover and Calais respectively, and the project has recently been revived by an English engineer.

But the greatest achievement in tunnelling is unquestionably the vast work now in course of execution at Mont Cenis, or rather at the Col de Frejus, one of the sharp *sierras*, or saw-like ridges of Mont Cenis, in the High Alps, and intended to convey across the Alpine barrier the Paris and Turin Railway.

When fully completed it will be 12,220 mètres, or 7·5932 English miles in length. The French, or northern end, near Modane, is at the entrance 3945 feet above the level of the Mediterranean. Thence the tunnel passes with a rising gradient of 22·2 feet in 1000, to rather more than half its length, where, under nearly the loftiest point of the ridge overhead, the gradient will begin to slope towards Italy at the rate of 0·5 per 1000, and will debouche at Bardonnèche, on the Italian side of the mountain, about 24 miles from Susa, and at an elevation of 4379 feet above the sea-level.

Thus the traveller will actually have above his head a solid mass of rock greater in depth by nearly two-fifths than the whole height of Snowdon above the sea.

The width of the tunnel at Modane is 26 feet $2\frac{3}{4}$ inches; its height, 24 feet 7 inches. At Bardonnèche it is $21\frac{3}{4}$ feet high. The section is something of the shape of a compressed parabola, though formed of circular segments in its curved perimeter.

The rocks through which it is driven are of the following sorts, commencing at the Modane or northern terminus:—Micaceous and talcose sandstones, slaty and twisted in structure; quartzites; formations of gypseous rocks; limestones of fine grain, slaty structure, and of great hardness; and various argillaceous and calcareous schists, with siliceous veins.

The names of these rocks, however, convey to the ear of the geologist only acquainted with their congeners

in Great Britain no idea of their hardness and impenetrability in the Alps, where every rock, however geologically recent, has been exposed to such pressure and pyromorphic hardening that many at first are not recognizable at all as to their geological origin by the British savant.

Owing to its length and this intractable character of the rocks, it became necessary to devise some other means for constructing the Mont Cenis tunnel than hand labour and the old machinery, and consequently some most ingenious apparatus were invented, and have been so successfully employed that a work which would otherwise have occupied between forty and fifty years will now be completed in fifteen. It was begun in 1857, but the new perforating machines were not introduced until 1861 on the Italian side, and 1863 on the French. On the 30th of June, 1863, the tunnel had been driven 2800 yards, and the rate of advance was $9\frac{1}{2}$ feet a day. In October, 1866, 6680 yards, or half the distance, had been completed; and we may therefore expect that the whole undertaking will be finished in 1872. The Italian government are executing the work, and they will receive a premium from the French government for each year by which a term of twenty-five years, counting from 1862, is reduced. The French government will also pay 1,287,000*l.* for the construction of one-half the tunnel when completed.

The machinery spoken of has been invented by the engineers, MM. Sommeiller, Grandi, and Grattoni; though there can be little doubt but that they have freely availed themselves of the principles and ideas of the late ingenious Mr. Thomas Bartlett. It divides itself naturally into two groups: 1. The motive power, that is, the methods by which the water power of the region at either end is made to transfer itself, through the medium of compressed air, to the remote ends or foreheads of the work, there to set in action the penetrating machinery; and 2. The boring or rock-penetrating machinery itself.

The power employed at Mont Cenis is water. As it falls from the opposite sides of the mountain it is intercepted at a sufficient height to afford, at the Bardonnèche end, a head of 85 feet; a less one only could be obtained at the Modane terminus. Two sorts of machines are in operation, by which the air is compressed to a tension of five atmospheres by means of this water-power. At the Bardonnèche end these are of the sort called *à coups de bellier*, and are, in fact, colossal water-rams.

Each machine is a U-shaped siphon pipe, furnished with certain rams, so arranged that the descending column of water in one by rising into the other compresses the air pent between it and the valves, which near the top discharge into a large air-vessel. When the one oscillation of the ascending column of water has done this work, it is discharged by another valve at the lower part of the siphon, and its place filled with air ready for another compression by the next stroke. There are twelve or more of these *belliers*, all alike, working into a common reservoir, which is connected, by a pipe $7\frac{1}{2}$ inches in diameter, with the remotest interior end of the tunnel working or forehead. The main pipe of each bellier is 2 feet diameter, with, as has been said, 85 feet of head, and communicating with an air-vessel of 600 cubic feet of capacity. Such machines alone were employed at first; subsequently, at both ends of the tunnel, air-compressing pumps driven by water-wheels have been superadded.

These pumps have two horizontal cylinders, each

21½ inches diameter, with a 5-foot stroke, and making 12 strokes per minute. The pistons do not act upon the air directly, but by the intervention of an oscillating short column of water held above them, whereby leakage of the air past the pistons is avoided in great part. The air thus compressed and introduced to the forehead is there employed to set in motion small perforating machines, travelling upon a framework on wheels and railway laid in the tunnel, beneath which is the air-pipe. Each machine is much of the nature of a small high-pressure horizontal steam-engine, the prolonged piston rod of which is the steel drill or jumper, by the repercussion of which the rock is perforated for the admission of the charges of powder by which the forehead is successively blown away.

Each machine is so fixed to the frame that the direction of the blows of the jumper can be changed or fixed at will; and it embraces movements by which the jumper is twisted slowly on its own axis, and advanced as the hole deepens. Each machine makes 250 strokes per minute, with a stroke variable from 2 inches up to 7 inches. The striking *plus* pressure on the piston, or that over and above the back pressure or air-spring which brings back the piston and tool at the end of the stroke, is 216 lbs., so that at full stroke each machine is equivalent to 24 horse-power in action.

From the 7½ inch main, flexible pipes of vulcanized india-rubber, wrapped with wire to enable it to withstand the pressure, and of 2 inches internal diameter, supply the air to each machine.

There are eleven of these *percuteurs* or perforators at one end, and nine of them at the other, usually at work.

A large close vessel of water accompanies the carrying frame at each end, and is in communication with the air main, so that a stream of water, under a pressure of five atmospheres, is constantly squirted into each jumper hole while in progress, and washes out the debris, away from the cutting edge.

The machines weigh 6 cwt. each. They are so rapidly shaken to pieces, or damaged more or less by the recoil of the rough jarring blows to which they are constantly exposed, that it is necessary to have four machines always under repair for one in action.

About eighty jumper holes are bored *parsémé* over the face of the forehead, by changing the position of the several machines to each shift. When these are done, each from two-thirds of a mètre to a mètre and a half deep, the whole frame with the machine is drawn back on the rails about 100 yards. The holes are all charged with cartridges, and fired nearly simultaneously. A pair of temporary folding-doors, in advance of the place of the machines, are closed to prevent injury by chance projectiles.

The *deblai* is removed in small waggons, on side rails, as soon as possible after the explosion; and then the frame and machines are run up again to begin work anew.

In the Plate ('Tunnelling') prefixed to the present volume, we have figured some of the boring machines now in general use. Figs. 1, 2, and 3, represent the machine invented by the late Mr. Bartlett, which evidently suggested to the French engineers the machine employed on the Mont Cenis tunnel, and claimed as their own design. Fig. 1 shows the distinctive peculiarity of Bartlett's construction, in the employment of an *air buffer* between the piston of the steam-engine and the percussive end of the jumper or drilling tool, which is shown at the right-hand side of the figure. When the piston makes its forward stroke from left to right, it drives forward along with it the left-hand air piston,

and the latter, as soon as it has passed the air holes in the air cylinder, incloses and powerfully compresses the air in the latter. As soon as the elasticity of the included air has balanced the friction and inertia of the right-hand air piston, with its attached piston bar and jumper, these are driven forward before the compressed cushion of included air, and the stroke of the jumper is made; the whole of the momentum being directed against the rock at the bottom of the junction hole.

Fig. 2 is a lateral elevation, and fig. 3 a plan of Mr. Bartlett's machine, in which the relative positions of the steam and air cylinders and other parts will be easily distinguished.

The whole machine, fixed in or on its rectangular frame, rests on its lower side upon four friction rollers, one of which is seen on the lower part of the right hand of fig. 2; and by the action of the ratchet and pall seen in the same figure, producing a slow rotation in the longitudinal screw beneath the carriage, the whole machine is slowly propelled forward, as and at the rate that the jumper hole deepens.

Figs. 4 and 5 are devoted to the Mont Cenis tunnelling machines of M. Sommeiller, already referred to. Fig. 4 is a lateral elevation, and fig. 5 a plan. It is difficult for any impartial observer to avoid the conclusion that they were suggested, as we have said, by Mr. Bartlett's prior invention, with various ingenious modifications, which are scarcely improvements, and with the omission of the 'air-buffer' that relieved the machine from all direct blow or concussion. Rotation in both machines is produced by a longitudinal shaft driven in much the same way. In both, imprisoned air is made to limit the stroke; in both the forward motion is communicated by a screw movement. Bartlett's machine gives rotation to the jumper without obliging the driving piston to revolve with it in the cylinder. In Sommeiller's, and this is a decided inferiority, the plunger is made to revolve, and compels the jumper to revolve with it, producing much unnecessary friction, and unprofitable wear and tear.

Rock perforators of various descriptions, and all of more or less ingenuity, have multiplied of late years. In Sweden, Herrn Schwartz, Kopf, and Phillipson; in England, Messrs. Lows, Sopwith, Freeley, and Captain Penrice; and in France, Messrs. Vallouri and Brequet, have supplied the engineer with admirably devised apparatus, to which our limited space permits only this passing allusion. We cannot conclude, however, without a few words in reference to the boring machine recently introduced into this country by Messrs. Doering and Sach, and which has for some time been in operation at the zinc mines of the Société de la Vieille Montagne at Moresnet, near Aix-la-Chapelle. It is distinguished by its economy, simplicity, and speed (see Plate 'Tunnelling,' fig. 6).

Compressed air is the medium employed in working it, the piston rod of the compressed-air cylinder being provided with a socket for carrying the boring tool. The piston rod works through a bush on the front end of the cylinder, and from the opposite end of the piston another, but smaller rod, connected with a cross-head, passes through the opposite end of the cylinder. A key or feather is formed or fitted upon the smaller rod, which works through a corresponding keyway in a bush on the rear end of the cylinder. By imparting a rotatory motion to this bush, the same motion will obviously be transmitted to the smaller rod, and to the piston and boring tool. Suitable brackets are cast on the cylinder, which slide along parallel guide-bars, supported by a

torique sur la Percée du Mont Cenis, Chambéry, 1863; *Relazione della diregione Tunica, sulle Tragoso delle Alpi, &c.*, Turin, 1863.)

TUNNY. [THYNNUS.]

TUNSTALL. [STAFFORDSHIRE.]

TUPA, a genus of *Lobeliaceæ*, consisting of tall herbaceous plants or undershrubs, with unbranched stems, alternate lanceolate leaves, and many-flowered leafy racemes. They are natives of the West Indies, Peru, and Chili, in which latter country they obtain the name *Tupa*. A singularly acrid and poisonous product is obtained from *T. Feuillée*, which, if taken internally or applied to the skin, results in excessive vomiting and violent inflammation. It is said, at times, to prove fatal.

TUPAIA, a genus of mammals belonging to the order *Feræ*, and family *Talpidæ*.

Generic Character.—Head oblong, depressed. Snout long, equally attenuated; nostrils lateral, semilunar. Eyes very large and rather prominent. Ears large and oblong. Body cylindrical, covered with close fur and soft hairs. Tail longer than the body, linear, compressed. Feet plantigrade and pentadactyle, soles naked, claws falcular.

Dr. Horsfield states that in the Malayan language the name of *Tupai* is a general term for various small animals which have the external form and agility of the squirrel; while each different species, agreeably to the observations of the natives of the islands of the Eastern Archipelago, where these animals are found, is distinguished by a particular epithet. Five species are already known—three from the Indian Islands; one from Pegu, in the south of Birma; and another from the eastern Ghauts. The best-known species is the banxring (*Tupaia Javanica*), a native of Java.

Food and Habits.—Arboreal, feeding on fruits and insects. Sir Stamford Raffles states that a tame *Tupaia ferruginea* was suffered to go about at perfect liberty, ranged in freedom over the whole house, and never failed to present himself on the breakfast and dinner table, where he partook of fruit and milk. Dr. Horsfield also states that a living *Tupaia ferruginea* was brought to Bengal by a medical gentleman; it ran about the house tame, but would not allow itself to be caught for close inspection. Though at liberty to run out of doors whenever it liked, it showed no disposition to leave its quarters, and evinced some attachment to the family; for whenever strangers entered the house, it showed disquietude and made a chattering noise. It gave no trouble in feeding, for it was always on the search after insects; and its favourite food seemed to be flies, crickets, grasshoppers, and cockroaches.

TUPISTRA, a genus of plants nearly allied to the natural family of *Smilaceæ*. It is little known, but has sometimes been cultivated in our hothouses.

TURANIAN LANGUAGES. In general terms these languages may be said to include the idioms spoken by the Finns, Hungarians, and Turks in Europe, and by the tribes scattered over the whole of northern and eastern Asia, together with the dialects of the aboriginal inhabitants of southern India.

The word Turanian is derived from the root *tur*, 'to roam about,' and indicates the nomadic character of the tribes using these varieties of human speech.

The Turanian languages are opposed to those of the Semitic and Aryan races, and although containing the utmost variety of grammatical forms are now supposed to form a historical unity in themselves; and the connecting links between several branches of them have been laid open by the skill of comparative philologists.

The celebrated Rask was the first to group together, for the purpose of philological classification, the languages of the un-Aryan and un-Semitic races. He found in the language of Greenland a link of connection between the idioms of Asia, Europe, and America. Under the name of Scythian he classed the North Asiatic, the North American, the Tatar, and the Mongol Tungusian dialects.

The general principles of Turanian philology have been established by the researches of A. Castren of Helsingfors, the Chevalier Bunsen, and Professor Max Müller, whose labours in this department of philology are full of interest.

According to the last of these authorities, the Turanian languages may be divided into two divisions, the Northern and Southern. The *northern* division, sometimes called the *Ural-Altaic*, or *Ugro-Tataric*, comprehends the Tungusic, Mongolic, Turkic, Samoyedic, and Finnic branches. The *southern* division, which occupies the south of Asia, comprehends the Taic or dialects of Siam, the Malaic, or the Malay and Polynesian dialects, the Bhotiya or dialects of Tibet and Bhotan, and the Tamulic, or languages of the Dekkan.

In the northern division the Tungusic and Mongolic, in the southern the Taic and Malaic branches, are the nearest neighbours to the Chinese, not only in geographical position, but also in the low degree of their grammatical development. The distance from China seems to indicate the successive dates of their original separation from that country, and is also an index of the degree of grammatical perfection to which each has attained.

Next follow the Tataric in a northern, and the Bhotiya in a southern direction: the former spreading through Asia toward the European peninsula and the seats of political civilization; the latter tending toward the Indian peninsula and encircling the native land of the Brahmanic Aryans.

The most distant branches of the Turanian stock, and therefore probably the first to attain an independent growth, are the Finnic in the north, and the Tamulic in the south. The regularity and settledness of the grammar of these languages bear witness to an early literary cultivation, of which in India nothing remains but tradition, owing to Brahmanic encroachment, while in the Finns of Finland oral tradition has preserved, up to the present time, the songs of Wäinämöinen and of his sacred home, Kalevala.

From the great variety of the Turanian languages, it is difficult to state concisely their characteristic features; but the system of 'agglutination,' which is found also in the Hebrew and Sanskrit, is general among them. This agglutination means that, in their grammar, pronouns are glued to the verbs in order to form the conjugation; or prepositions to substantives in order to form declension. But the conjugation and declension can still be taken to pieces, and although the terminations have by no means always retained their significative power as independent words, they are felt as modificatory syllables, and as distinct from the roots to which they are appended. Again the root is never obscured, and the determining or modifying syllables are generally placed at the end. In these syllables the vowels are not so absolutely fixed as in Sanskrit or Hebrew; *e.g.*, if a verb contains a sharp vowel in its radical portion, the vowels of the terminations are all sharp, while the same terminations if following a root with a flat vowel, modulate their own vowels with the flat key. Thus in Turkish we have *sev-mek*, 'to love,' but *bak-mak*, 'to regard,' *mek* or *mak* being the termination of the infinitive.

Also *ev-ler* 'the houses,' but *at-lar* 'the horses,' *ler* or *lar* being the termination of the plural.

TURBAN, an Arabic word, used to designate the customary head-dress of the Turks and other Oriental nations. Its form is by no means invariably the same, but differs in different countries and among different ranks. It always contains two parts, however; the brimless quilted skull-cap, fitting to the head; and a sash or shawl, of cotton or linen, twisted round the cap, with its ends hanging down behind. The sultan's turban is enriched with precious stones, and ornamented by a plume of three heron's feathers.

TURBINE (Lat. *turbo*, 'a revolving object'), a species of horizontal water-wheel, impelled by the action of a constant current of water upon certain inclined vanes or fans which are fitted to its circumference. The principle of the machine has been applied by Mr. Ruthven, who patented his invention in 1849, to the propulsion of ships, and has been successfully worked out in connection with the iron-clad gunboat, *Waterwitch*, of 778 tons, launched in 1866. A large turbine is put in motion by powerful machinery. The water contained in it is driven by centrifugal force, at the rate of 300 tons a minute, out of nozzles in the vessel's sides; while to supply the vacuum thus produced, water rushes in through valves in the bottom. By means of a double valve, the nozzles open backwards or forwards, and the required motion is communicated to the ship by the direct action of the expelled water. It is said that this new mode of propulsion is as economical as the paddle or screw, while it affords great facilities for steering, and for pumping water out of the ship. It does not attain an amount of speed equal to the application of steam-power; but the experiment has yet to be tried on a more extensive scale.

The turbine, viewed as simply a horizontal wheel of impulse or reaction, is in all probability the most ancient form of water-wheel. The oldest known to be extant is that of the Brisach mill at Toulouse, still, or at all events very recently, at work. Marnoury, Buedin, and others, early in the present century produced several improved and not ineffective machines, but Fourneyron, about 1807, must be regarded as the real originator of the modern turbine.

In the Plates 'Turbines,' 1 and 2, prefixed to this volume, we have figured some of the latest and most improved forms. Thus figs. 1 and 2, Plate 1, are devoted to B. Donkin & Co.'s vertical current turbine, which has a revolving disc of 3 feet 6 inches diameter, is altogether wrought of cast iron, and prepared to be receptive either of a high or low fall of water.

A turbine of somewhat similar type for lower falls has been designed by Fontaine & Brault, of Paris (Plate 2, fig. 1). In this the line of fixed directrices is divided into two parallel rings of buckets by an intermediate *septum*, whose object is to admit of shutting off the interior ring (or half) of the entire apertures of discharge, in times when the supply of water might run short. Fig. 1 represents a vertical elevation; fig. 2, vertical and horizontal sections of another turbine by the same makers, intended for high falls of 70 to 80 feet.

A cast-iron cased turbine, by Messrs. Easton & Amos, the well-known hydraulic engineers of London, is shown in vertical axial section in Plate 1, fig. 4. It differs from the two former machines in that it receives the water at the centre, and discharges it radially at the circumference. There are twenty directrices and forty buckets, the curves being skilfully adjusted. The method of drawing on or shutting off the water is by a cylindrical sluice, which being rotated by means of pinion and sector work, and passing over four inclined planes (elementary screw threads) is raised or dropped vertically *between* the ring of fixed directrices and the revolving ring of buckets.

Schiele's patent turbine is shown in Plate 2, figs. 3 and 4. Fig. 3 illustrates its horizontal, and fig. 4 its vertical section. It is one of those which receive the water at the circumference, and deliver it at the centre.

The only other recently invented turbine which our limits will permit us to notice is the vortex wheel, designed by Professor Thomson, of Belfast; patented and manufactured by Messrs. Williamson Brothers, of Kendal (Plate 1, fig. 3). It also receives the water at the circumference, and delivers it at the centre. Its general exterior character, as designed for high falls, and therefore large pressure and small volume, is very well shown in our illustration. These wheels realize, on an average, a useful effect of 79 per cent.

The two principal advantages claimed for this kind of turbine over those receptive of water at the centre, are:—1st. That the requisite full supply for the buckets—generally a matter of some difficulty to insure in central receptive turbines when moving rapidly—is by this construction easily procured. 2nd. That these turbines are, by the very effect of centrifugal force, reactive on their own water, more steady in moving under variable loads, and possessing a certain amount of inherent self-governance.

TURBI'NIDÆ, a family of gastropodous Molluscs belonging to the *Pectinibranchiata* of Cuvier. This zoologist, in his 'Régne Animal,' divides the *Pectinibranchiata* into the following sections, or, as he calls them, families:—*Les Trochoides, Les Capuloides, Les Buccinoides*. He divides *Les Trochoides* into *Les Toupies, Les Sabots* (*Turbo*, Linn.), and several other minor groups.

Les Sabots comprehends the genus *Turbo*, as at present restricted, the genera *Meleagris* (Montf.), *Delphinula*, *Pleurotomarium* (fossil), of which he considers the *Scissurellæ* of M. D'Orbigny to be the living representatives, *Turritella*, *Scalaria*, and the terrestrial and fresh-water genera *Cyclostoma* and *Valvata*. Cuvier thus makes the *Sabots* to comprehend all the species which have the shell completely and regularly turbinated with a mouth entirely round.

He observes of the group *Les Sabots* M. de Blainville makes his family of *Cricostomata*. We may here add that this family consists of the genera *Turbo*, *Delphinula*, *Phasianella*, *Imperator*, *Trochus*, *Rotella*, *Monodonta*, *Adeorbis*, *Euomphalus*, *Stomatella*, *Broderipia*.

General Characters.—Shell variable in general form, with an aperture always nearly circular, and closed by a calcareous or horny operculum; spiral whorls few; apex substantial.

As examples of the family *Turbinidæ* we select the following genera:—

Gen. *Turbo*.—Examples.—*Turbo marmoratus*. This shell, deprived of its outer layer, exhibits a brilliant silvery nacre, and in this state is commonly sold as an ornament. *Turbo torquatus*, from King George's Sound. *Turbo Cookii*, from New Zealand, Tasman's Bay, &c.

Fossil species of *Turbo* are numerous.

We proceed to the consideration of the genera *Neritæ*, *Navicella*, and *Natica*, which, though they do not belong to the *Turbinidæ*, are yet so far analogous to the forms which compose that family, that they may as well find a place here.

The *Neritæ*, with a comparatively thick shell, which is very rarely furnished with an epidermis, are always

found in the sea; and the *Neritinæ* of Lamarck, whose shell is more delicate and almost constantly covered with an epidermis, are always inhabitants of fresh water. The Nerita pass a part of their life out of the water without ever removing to a distance from it. Those which haunt streams or marshes may adhere to the leaves of trees, but without going on land.

MM. Quoy and Gaimard state that they were sometimes astonished to see these animals bear, upon the black rocks, all the action of an equatorial sun without appearing to be affected by it. They owe this faculty to providing, when they adhere, some drops of water which sufficiently refresh their branchiæ. This store, or what is left of it, they discharge when lifted from the rock.

The Nerits are very widely spread in warm climates. They are gregarious, and many species are found grouped on the same rock. Some love sheltered nooks, others are exposed to the fury of the waves: and among those which haunt fresh-waters, some live in the deeps in the midst of the strongest currents; others, on the contrary, keep themselves in the slime of marshes. In their sufficiently agile movements their lips are constantly observed in motion.

The animal has a large head, a little notched in front, with two rounded lobes on the sides. The aperture of the mouth, which is subjacent to this sort of hood, is wide and plicated. The tentacles are always very long, pointed, and soft, carrying the eyes at their base upon a pedicle. The foot is oval, narrowed, a little pointed behind, wide in front, with a marginal furrow, and sometimes a depression, which gives it the appearance of being slightly lobated.

Examples.—*Nerita polita, N. Ascensionis, Neritina fruligera. Nerita* is numerous in fossil species.

Gen. *Navicella.*—Example.—*Navicella elliptica*, fluviatile; from Indian Archipelago.

Gen. *Natica.*—Example.—*Natica melanostoma*, from the Moluccas, &c. This genus occurs in a fossil state in the Old World, and in the tertiary of Alabama, and the cretaceous group of New Jersey.

The *Neritidæ* comprise the following genera:—*Nerita, Pileolus, Neritina*, and *Navicella.*

TURBOT. [PLEURONECTIDÆ.]

TURDUS. [THRUSHES.]

TURENNE, HENRI, VICOMTE DE, second son of Henri duc de Bouillon and of Elizabeth of Nassau, was born September 11, 1611.

His father died in 1623; and jealousy of the designs of Cardinal Richelieu to the prejudice of the Huguenots induced his mother to send Turenne, in 1625, to Holland, to the charge of his uncle Prince Maurice. Three months afterwards the latter died, but his brother, Henry Frederic, was equally attentive to their young relative, who in 1626 obtained a company of infantry, and served under his uncle till 1630, in the Dutch war.

In 1630 he was sent by his mother as a hostage to the French court, in order to avert the designs of Richelieu against the sovereignty of his brother the duc de Bouillon, still a minor. Turenne, whose reputation for military science had preceded him, was, though only nineteen, appointed to the command of a regiment of infantry. The first opportunity he now had of distinguishing himself was at the siege of La Motte in 1634: his conduct on that occasion procured for him the appointment of maréchal-de-camp.

In 1635 the cardinal de Richelieu sent four armies into the field to attack the Spaniards simultaneously on as many different points. Cardinal de la Valette was placed at the head of the forces destined to co-operate with the Swedes in Germany, and Turenne was attached to him as maréchal-de-camp. During the disastrous campaign that followed, he sold his plate to procure provisions for the soldiers under his immediate command; and while discipline was almost entirely lost and the baggage thrown away by the rest of the army, he retained his troops in their accustomed order, and abandoned only so much of the baggage as enabled him to procure waggons for those who were unable to march. He again attended La Valette in the campaign of 1636, on the Upper Rhine; and in 1637 in Flanders. The latter was a campaign of sieges, and their conduct devolved almost exclusively upon Turenne, who closed the campaign by driving the Spaniards across the Sambre. In 1639, after some further service on the Upper Rhine, he was sent to Italy, second in command to the comte d'Harcourt, who, adopting the advice of Turenne in opposition to all the rest of his generals, laid siege to Turin, which surrendered September 17, 1640. D'Harcourt then returned to France, leaving the army under the command of Turenne, who, however, was soon superseded in consequence of the duc de Bouillon's quarrels with the French court. Turenne was next ordered to Germany, where, during the winter 1643–44, he succeeded by raising money on his own credit, in re-equipping the army which had been raised by the duke of Weimar, and restoring its discipline. With this army, so great was his power of conciliating the affections and keeping up the spirits of the soldiery, he struggled through five campaigns.

When the disturbances broke out at Paris, at the commencement of 1649, Turenne rejected the overtures of Mazarin, but finding that resistance would be vain, retired to Holland with some of his personal friends. A hollow truce was soon after arranged between the contending factions, and he returned to France. When Condé was thrown into prison, he proved faithful to him, threw himself into Stenai, and prevented its being taken by the royal troops. He alone rallied the dispirited friends of Condé, procured the release of the prince, the exile of Mazarin, and the conclusion of a peace with Spain.

He returned to Paris in May, 1651, and having, as he said, discharged his duty to Condé by procuring his release from prison, declared for the regent and Mazarin, and accepted in 1652 the command of the royal army. It was soon evident that the same mind which upheld the prince of Condé's cause when he was imprisoned, now struggled to uphold the royal authority against as fearful odds. But his genius maintained its ascendant, and by the close of the year Condé was obliged to quit France: the king was crowned at Rheims, entered Paris, and consigned the cardinal de Retz, the only remnant of the Fronde, to a dungeon.

From 1653 to the conclusion of 1659 Turenne's military capacity found ample scope in the campaigns in the French and Austrian Netherlands, which were concluded by the treaty of the Pyrenees.

The death of Mazarin in 1661, and the resolution of Louis XIV. to be thenceforth his own prime minister, though it did not raise Turenne to office, gave him a powerful influence in state affairs. The first sensible effect of this influence was the resolution of Louis to protect the independence of Portugal, which Mazarin had resolved to sacrifice to the Spaniards. Turenne's credit with De Witt was mainly instrumental in opening the negotiations with Holland which led to the treaty of commerce concluded with that power. When, in 1665,

England and Holland severally endeavoured to induce Louis XIV. to assist in the war against the other, it was by the advice of his great general that the king tried to reconcile the belligerents.

Turenne had been educated by a moderate Calvinist, and like most active men who seek not a religion of abstract opinions, but of practical influence, he cared little for doctrinal points. The death of his wife, the daughter of the duc de la Force, in 1666, removed the last tie that bound him to the Protestants; and he was received into the bosom of the Roman Catholic church by the archbishop of Paris. His change of religion cannot be called a conversion in the high sense of the word; it was merely an additional step in the process of changing him into a thoroughly naturalized Frenchman.

Louis availed himself of the peace between England and Holland, in 1667, to form a combination against Spain, with a view to make himself master of the Spanish Netherlands. The campaign in Flanders was the consequence. The victories gained by Turenne from 1672 to 1675 serve only, so far as he is concerned, to place in more brilliant light the qualities which he had amply displayed on former occasions. He fell near Sassbach, July 27, 1675, while preparing to lead his troops into action.

TURGITE, a compact reddish-brown mineral, composed chiefly of hydrated peroxide of iron. It is procured from the Turginsk copper mines in the Oural mountains.

TURGOT, ANNE ROBERT JACQUES, was born in Paris, May 10, 1727. He was destined for the ecclesiastical profession, but entertained some conscientious objections; he therefore studied the law, and became a maître des requêtes. In 1761 he was appointed intendant of Limoges, and during the thirteen years that the province was under his administration, the more equitable distribution of imposts, the making of roads, the militia, the providing of subsistence for the people, and the protection of commerce, were the principal objects of his labours.

On the death of Louis XV. a wider field was opened for Turgot's enlarged and beneficent policy. The state of France demanded a reforming minister; and the public voice called him to the highest offices. He was at first minister of the marine; but after continuing only a month in this situation, he received the appointment of contrôleur-général, then equivalent to that of the English premier.

One of his first measures was the establishment of a free trade in corn in the interior of the kingdom. He also passed a law abolishing the corvées (which consisted in the repair of the high-roads by the compulsory labour of the poor inhabitants of the district) throughout France, a law which was revoked immediately after Turgot's removal from office. Having by enactments of this kind nearly abolished the servitude of the inhabitants of the rural districts, Turgot also abolished most of the restrictions and exclusive privileges under which the inhabitants of the towns suffered.

The characteristics of his financial administration were exactness in payments, fidelity to engagements, and a reduction of expenditure whenever it could be effected without hardship and injustice. 'He had augmented the public revenue,' says Condorcet, 'without putting on a new impost, and after having suppressed or diminished several; and without having recourse to new loans, he had made repayments and diminished the debt. All these labours had been the work of twenty months; and two attacks of gout, an hereditary malady in the family of M. Turgot, had hindered him for several months from carrying on his plans.' In the midst of these sufferings his enemies were at work against him: all those who had lived by abuses—nobles, courtiers, financiers, farmers of the revenue—united in a confederacy against the reformer, and drove him from his office in less than two years.

After his retirement he occupied himself principally with the physical and mathematical sciences. He likewise indulged his early taste for literature and poetry. But his attacks of gout became more and more frequent, and he died March 20, 1781.

His principal works are—'Réflexions sur la Formation et la Distribution des Richesses;' 'Lettres à M. le Contrôleur-Général sur le Commerce des Grains;' and 'Extension de la Liberté du Commerce des Colonies.'

TURIN (Italian, *Torino*), a province in the N. of the kingdom of Italy, is divided from France by the Alps, and includes an area of 3964 square miles. Its population in 1864 was 924,209.

The Cottian and Graian Alps, with their ramifications between Monte Viso and Mont Iseran, cover all the north and west of the country, forming a great number of valleys, which are drained by rivers that enter the Po on the left bank. The rest of the surface is mostly level, forming part of the great plain of the Po, which is the only important river in the province. [Po.] Besides Monte Viso and Mont Iseran, the most remarkable summits are those of Mont Genèvre and Mont Cenis, over the depressions near which are the fine roads formed by Napoleon connecting Turin with Briançon and Chambery. [Alps.] The work of cutting a tunnel through the Alps, under the ridge of Mont Cenis, is now (1868) two-thirds completed. [Tunnelling.]

The bulk of the population of the district is engaged in agriculture and cattle feeding. The number of horned cattle fed on the mountains and other pastures is very great. There are comparatively very few horses: oxen are used in the plough and for draught; pigs are numerous. The chief products are wheat, maize, rice, barley, chestnuts, beans, oats, potatoes, fruits, good wine, silk, hemp, and flax. There are extensive forests on the mountains, which also contain iron and copper ore, marble of different colours, &c. The manufactures are named under the towns.

The province of Turin is subdivided into the five districts or circles of Pinerolo, Turin, Susa, Ivrea, and Biella. We append a brief notice of these, and of the principal places in each:—*Pinerolo*, or *Pignerol*, in the extreme south, occupies the basin and valley of the Chisone, a tributary of the Po. Its surface is undulating and fertile; and corn, excellent fruits, good wine, chestnuts, and silks, are the chief products. The forests are extensive, and there is a great breadth of mountain pasture, on which large numbers of cattle are fed. *Pinerolo*, a walled town, is situated at the foot of the Alps, near the left bank of the Chisone, and 21 miles S.W. of the city of Turin; has several churches and convents, a handsome cathedral, a large hospital, barracks, manufactories of silk, woollens, leather, paper, and iron; and about 16,000 inhabitants.

The circle of Turin lies N. of Pinerolo, occupying the lower portion of the valleys of the Sangone, the Dora-Riparia, the Stura, and the Orca, all of which fall into the Po. It comprises a large extent of level fertile land, including the fine plain of the Po. Extensive forests and pastures, abundant wheat crops, wine, and silk, form the elements of the wealth of this country; iron, vitriol, marble, and lime, are the chief minerals. The industrial and commercial activity is considerable.

TURIN is the chief town. *Rivoli* is on the road to Susa, 8 miles W. of Turin, with which it communicates by a continuous avenue. It has a royal palace, in which Victor Amadeus II. was confined in the interval between his attempt to re-ascend the throne and his death, 1730–32; and also contains numerous fine villas, and a botanical garden. The inhabitants number 5600, who carry on manufactures of silks, linen, and woollen fabrics, &c. *Chieri* (*Carea*), is 9 miles S.E. of Turin, and has more than 15,000 inhabitants. This place, which is well built on the hills of Monferrato, is one of the most ancient manufacturing towns in Europe, but it has suffered greatly from wars, inundations, and pestilence. It contains several churches, convents, and palaces, and an important silk market; besides manufactures of silk, cotton, and linen goods. *Moncalieri*, which stands on the right bank of the Po, 4 miles S. from Turin, is a station on the railway to Genoa. It has a population of nearly 10,000; and a royal palace, containing a collection of portraits. *Carmagnola*, on the right bank of the Po, 16 miles S. of Turin, has manufactures of jewellery, and important markets for silk, corn, hemp, oil, soap, cheese, cattle, &c. Population, 12,512. *Chivasso*, with 8600 inhabitants, is situated on the left bank of the Po, near the confluence of the Orca, 15 miles N.E. of Turin, in a plain abounding with wheat and rice fields and cattle. The town is celebrated for its lampreys. It is inclosed by a wall, and was stormed and taken by the French in 1804. Here are the remains of the palace of the marquis of Monferrat.

The circle of Susa lies N. of that of Pinerolo, and between the high Alps and Turin. A considerable portion of it is on the slope of the great Alpine ridge, which here forms the groups of Mont Cenis and Mont Genèvre. The river Dora Riparia, rising on Mont Genèvre, crosses the country from east to west, and passes the capital. The valley of Susa is fertile, and produces corn, wine, flax, hemp, and mulberries. The highlands yield abundance of chestnuts, and afford good summer pasture. Near Bussolino, a village on the high road to Turin, and 5 miles E. of Susa, is a quarry of green marble, which resembles the verde antico of the ancients. The great road from Turin to Savoy and France over Mont Cenis ascends the valley of the Dora Riparia as far as Susa, and then turns to the northward, over Mont Genèvre to Briançon in Dauphiné. Another carriage road runs up the valley through Exilles, Oulx, and Cesanna. *Susa*, the ancient *Segusium* or *Segusio*, the chief town of the circle, is a bishop's see, and has about 5000 inhabitants. North of the city is a triumphal arch of white marble, 40 feet high and 25 wide, raised in honour of Augustus, which stands across the ancient Roman road to Gaul. [PIEDMONT.]

The district of Ivrea, sometimes called *il Canavese*, from the quantity of hemp (canapa) it produces, lies N. of Turin, and is divided from Aosta by a spur that runs eastward from Mont Iseran to the Dora-Baltea, an affluent of the Po. The surface N. of the town of Ivrea, which is situated at the entrance of the great plain, is traversed by offshoots of the Alps, forming numerous picturesque and fertile valleys. The soil yields abundance of corn and hemp, and of grapes, from which excellent wine is made. The pastures are good, and cattle very numerous; silk is an important product. The plain and the valleys are made very productive in parts by a system of irrigation connected with the Dora-Baltea and other streams. Chestnuts are very plentiful on the mountains. Iron, copper, marble, slate, and

building stone, are the chief minerals. *Ivrea* the capital, and most important town, is prettily situated on the slope of a hill above the left bank of the Dora-Baltea, which river is crossed by a Roman bridge of a single arch. It is an old-looking town, surrounded by walls and defended by a castle; it gives title to a bishop, has an old cathedral, several churches and convents, theological and royal colleges, theatre, public baths, and an hospital. The cathedral, which is in the Gothic style, is supposed to occupy the site of a temple of Apollo, and is said to have been founded in the fifth century; some of the churches are also of great interest from their antiquity. Ivrea is 28 miles N.E. of Turin; is celebrated for its carnivals, and contains nearly 10,000 inhabitants, who manufacture vermicelli, woollen and silk goods, and carry on a brisk trade in rice and hemp. During the French empire, under Napoleon I., it was the capital of the department of Doire.

The circle of Biella lies E. of that of Ivrea, and has no rivers, except some small affluents of the Po. The northern portion is covered by offshoots of the Pennine Alps, but a great part of the surface is level and very fertile. The chief products are corn, rice, hemp, silk, and wine—the latter being the best in Piedmont. Cattle are very numerous. Iron and copper are found. The system of irrigation is extensively adopted. *Biella*, the chief town, situated on the slope and at the foot of a hill, 36 miles N.N.E. of Turin, gives title to a bishop, has a cathedral and several churches, a college, woollen and silk manufactures, and 10,000 inhabitants. There is a good trade in wine, silk, oil, and chestnuts.

TURIN, a city of Northern Italy, formerly capital of Piedmont, and afterwards of the kingdom of Italy, is in 45° 5′ N. lat., 7° 44′ E. long., 89 miles W. by S. from Milan, on the left bank of the Po, at the point where that river is joined by the Dora Riparia, and occupies the site of the ancient *Augusta Taurinorum*. It lies in a wide and fertile valley, between the lower offsets of the Cottian Alps on the W., and the hills of Monferrato, which rise immediately above the right bank of the Po. The valley opens to the N.E. into the wide plain of Lombardy; and the general appearance of the city and surrounding country is scarcely to be surpassed in grandeur. The population of the town in 1863 was 235,000; but it was reduced to 204,715 in 1866, in consequence of the removal of the court and government to Florence in the preceding year.

The environs are very beautiful, and are studded with villas. The vicinity of the Alps, which adds so much to the magnificence of the scenery, has, however, an injurious effect on the climate, making the winter cold, and often sending down heavy storms of hail and rain. Railways connect Turin with Genoa, Novara, Vercelli, &c. The city is supposed to have been founded by a Ligurian tribe of Transalpine origin. Shortly after Hannibal crossed the Alps he made himself master of the territory in which it was situated; but after his expulsion from Italy the Romans took possession of it, and converted it into a Roman colony, which they called *Colonia Julia*; and this name was afterwards changed to *Augusta Taurinorum*, in honour of Augustus. It was taken and sacked by the Goths under Alaric, shortly after which it was surrounded by walls, but did not escape the ravages of the Longobards. In 1418 it was declared by Amadeus V. (into whose family it had been conveyed by a marriage with the heiress of the marquis of Susa) the capital of the states of Savoy; and following the fortunes of that dynasty, it ultimately rose to be the metropolis of the kingdom of Sardinia. It has sustained

two memorable sieges—one in 1649, in the contest between the French and Spaniards, and the other in 1706, during the war of the succession, which ended in the defeat of the French by Victor Amadeus. At the time of the French empire under Napoleon I., it was the chief town of the department of the Po. The first Parliament of the new kingdom of Italy was held here on the 18th February, 1861, but the seat of government was afterwards transferred to Florence, in accordance with a convention between the Emperor Louis Napoleon and Victor Emmanuel.

Modern Turin is one of the most regularly-built towns in Europe; nearly all the streets being in straight lines and intersecting each other at right angles, and the squares being also of a regular form. The streets are kept cleaner than in most other Italian cities, being washed during the night by water drawn from the Dora. The buildings, though massive and lofty, are, generally speaking, built of brick, and their appearance would be monotonous and unpleasant if the uniformity was not relieved by their height, by the endless variety of their sculptured fronts and rich decorations, as well as by the fine bursts of scenery which are ever opening on the view. In modern times Turin has been enriched by most extensive additions to its ornamentation, both architectural and statuesque. The city is now about 4 miles in circumference; it was formerly surrounded by ramparts, which have been razed, and replaced by additional buildings and promenades. The citadel, which is regularly constructed, and one of the strongest in Italy, lies to the westward.

There is a magnificent stone bridge of a single arch, with a span of 150 feet, over the Po; and another of five elliptical arches over the Dora. Several of the principal streets and squares are lined with arcades; and the approach to the city from the W. is by a noble avenue, which, commencing at the town of Rivoli, is one of the longest in Europe. The finest squares are—the Piazza del Castello, which is of great extent; the Piazza-di-San-Carlo, almost entirely surrounded by arcades, and adorned with a striking statue of Emmanuel Filiberto, by Marochetti; the Piazza-di-San-Giovanni; the Piazza-reale, nearly in the centre, and from which run several handsome streets; and the Piazza-dell'-Erbe. The Strada del Po, leading to the bridge over that river, contains many lofty palaces. The Piazza-del-Castello is so called from an old castle or palace (now the Palazzo Madama) standing in the middle of it, which was formerly the residence of the dukes of Savoy. It has a handsome façade, ornamented with sculptures. The northern side of the square is formed by the royal palace, a vast structure, with gardens at the back; the apartments, which are handsome, contain a rich collection of Flemish and Italian paintings, and a private library of 40,000 volumes, besides some curious MSS. and letters. Adjoining the palace is the cathedral of San Giovanni Battista, with the annexed handsome rotunda chapel of Del Sudario, cased with black marble, and adorned with gilt bronzes. The cathedral is a Gothic structure, and its interior has been decorated with frescoes. It was formerly very wealthy in plate and jewels, which Napoleon I. sold, and applied the proceeds to embank the Po, and build the bridge across that river. On the eastern side of the square is the great theatre, one of the largest and finest in Italy, constructed by the architect Alfieri. The university, erected by King Victor Amadeus at the beginning of the eighteenth century, is a fine building, with a spacious court, surrounded by arcades, which are lined with ancient bassi-rilievi, and inscriptions fixed in the walls. Its library contains above 120,000 volumes and MSS. The Gallery of Ancient Statues has amongst other remarkable objects, a Minerva, in bronze, a sleeping Cupid, a bust of the Emperor Julian, and the Isiac Table. The Cabinet of Medals contains 20,000 pieces. The Egyptian Museum, which is in the building of the Royal Academy of Sciences, is one of the richest in Europe. The royal armoury, a large and curious collection, in the king's palace, is considered one of the principal sights in Turin. Besides the statue of Filiberto, there is another of Carlo Alberto, also by Marochetti: those of Gioberti, the group presented to the city by the Milanese, and the pair outside the duke of Genoa's palace, are all likewise very fine.

Attached to the university are a museum of natural history, a museum of anatomy, a chemical laboratory and hydraulic apparatus, and a botanical garden at the Valentino, near the banks of the Po. The Royal Academy of Sciences—begun as a private society in 1759, and instituted as an academy in 1783—is divided into mathematical and physical, and moral, historical, and philological sciences; and has published numerous volumes of Memoirs.

Turin has also an academy of the fine arts, a philharmonic academy, an agricultural society, a military college, an arsenal, barracks, a fine cemetery, royal gunpowder manufactory; an episcopal seminary, occupying an elegant structure; a royal military academy; and numerous schools, including institutions for the deaf mutes and the blind.

The charitable associations of the city are admirably conducted; they include hospitals for the infirm, for destitute children, and the old; lying-in and ophthalmic hospitals; three other hospitals, one of which receives 6000 patients annually, and relieves 120,000 out-door sufferers; a lunatic asylum; a house of industry, the inmates of which are taught trades; an institution for affording out-door relief to the disabled poor; a monte-di-pietà; the *Retiro delle Rosine*, an asylum for the female poor founded in 1740 by a poor girl of Mondovì; and two penitentiaries, one for men and the other for women. The *Retiro delle Rosine* is a kind of religious community, in which 400 girls are maintained by their own labour. Other conspicuous edifices are the register offices, and the custom-house adjoining it; the town-house, with a lofty tower; the court-houses, &c.

Turin gives title to an archbishop, whose province extends over the sees of Alba, Acqui, Asti, Cuneo, Fossano, Mondovì, Ivrea, Pinerolo, Saluzzo, and Susa. It contains about fifty churches, few of which are remarkable for their external architecture. Those worthy of notice are—San Filippo-Neri, in which are several good paintings; San Maurizio, surmounted by a fine dome; Corpus Christi, noted for the richness of its marbles, gilding, and other decorations; the Consolata; the Corpus Domini, which is very richly decorated; Santa-Teresa, Santa-Cristina, La-Trinità, and San Carlo-Borromeo. There are numerous convents and nunneries; and a handsome Waldensian church, in the old Lombard style, was built in 1853. In the suburb on the right bank of the Po, facing the bridge, is the church 'Della Gran Madre di Dio,' raised by the municipality, in memory of the restoration of the dynasty of Savoy, in 1814. It is an imitation of the Pantheon of Rome, is cased with marble, and adorned with marble pillars. Higher up on the hill is the Capuchin church and convent 'Del Monte,' beautifully situated, and enjoying a splendid view of the plain of Turin, the

town, the river, and the crescent of the snow-capped Alps. On a higher hill on the same side of the Po, but farther north, about 2000 feet above the sea, and 5 miles from Turin, is the Royal Basilica of La-Superga, containing the tombs of the princes of the house of Savoy. It is a handsome structure; its lofty dome is seen at a great distance, and is the first object that strikes the traveller on approaching the town. The terrace in front of this church commands one of the best views of the plains of Lombardy, girded by the Alps on the N., and the Apennines on the S.

The manufactures of the city comprise woollen cloths, silks, velvets, hosiery, hats, gloves, optical instruments, chocolate, liqueurs, tobacco, leather, paper, earthen and china-ware, carriages, arms, and tapestry. The silk manufacture and trade employs a vast number of hands, and forms the principal source of wealth. Other articles of commerce are corn, wine, and fruit.

Turin possesses, in addition to the royal theatre alluded to above, the theatre of Carignano, for the opera; the theatre d'Angennes, for dramatic pieces unaccompanied by music; the Vittorio Emanuele, and four or five others. Besides the buildings already mentioned, some of the town-houses of the nobility and the royal residences in the neighbourhood are deserving of notice.

TURKEY, or THE OTTOMAN EMPIRE, comprehending all the countries in which Turkish supremacy is directly or indirectly recognized, includes some of the fairest portions of the world, and several of its earliest and most celebrated seats of civilization. It is not so much a continuous dominion, as a mere aggregate of governments, often widely separated both by position and interest, and only accidentally united by having been the subjects of a common conquest. Its vast territories, consisting partly of mainland, and partly of islands scattered over the bosom or along the shores of inland seas, are situated in three different quarters of the globe, viz., in the S.E. of Europe, the W. of Asia, and the N.E. of Africa; they extend over 37 degrees of lat. (from 11° to 48° N.), and 41 degrees of long. (from 8° to 49° E.), and though scarcely admitting of being geographically defined as a common whole, may be considered as bounded, N. by the Black Sea, Russia, and Austria; W. by Austria, the Adriatic, the Mediterranean, Algeria, and the African Desert; S. by the desert, Soodan, Abyssinia, and the Gulf of Bab-el-Mandeb; E. by Independent Arabia, the Persian Gulf, and Persia; and N.E. by Transcaucasian Russia. The total area of the empire is estimated at 1,812,048 square miles, and the population at 35,350,000.

As the leading divisions of the empire form the subjects of separate articles, in which the more important details respecting them are given, we shall here only attempt a general description. To prevent confusion, the territories of each continent are presented under the separate heads of Turkey in Africa, Turkey in Asia, and Turkey in Europe.

TURKEY IN AFRICA may be considered as an immense triangle, one side of which, facing the N., is formed by the S. shore of the Mediterranean, and another, facing the E., by the W. shore of the Red Sea and the Isthmus of Suez, while the base or third side is represented by an indefinite line drawn across the desert in the S.E. direction from the frontiers of Algeria to those of Abyssinia. It originally included Algeria, and still includes the three separate governments of Tunis, Tripoli, and Egypt, the last comprising not only Egypt proper, but also Nubia or Dongola, and Senaar. The aggregate area, estimated at 943,740 square miles, amounts to more than one-half, but the population, only 3,800,000, falls short of one-ninth, of that of the whole empire. This great disproportion indicates the nature of the territory, a large part of which is composed of sandy deserts in the partial occupation of wandering Arabs, though there are not wanting other regions which strikingly contrast with the general barrenness. Tunis, belonging principally to the plateau of the Atlas, is intersected by many fertile valleys, and, owing partly to its natural resources and its maritime advantages, became the seat of an empire (the Carthaginian) which long contended for mastery with that of Rome; and Egypt, enriched by the periodical overflowings of the Nile, continues, in spite of all that barbarism has done to mar its fertility, to be one of the principal granaries of the world.

Their remoteness from the seat of government renders it difficult for the Turkish authorities to maintain as firm a hold on their possessions in Africa as on those parts nearer Constantinople; but the Sultan nevertheless still exacts a tribute from most of the rulers, and in other ways shows that his authority is something more than nominal. The Turkish dominions in this continent are described in the articles BARCA, EGYPT, FEZZAN, NUBIA, SENAAR, TRIPOLI, and TUNIS.

TURKEY IN ASIA, taken in its widest sense, includes within its geographical limits the long belt of Arabia which lines the E. shore of the Red Sea, and consisting of the two provinces of Hejaz and Yemen, now forms the eyalet of Habesh, which has an area of 194,400 square miles. This eyalet, however, being politically attached to Egypt, is seldom considered as forming part of Turkey in Asia, which is usually confined to that part of the Asiatic continent lying between lat. 31° and 42° N., and long. 26° and 48° E., and bounded N. by the Black Sea, the Bosporus or Straits of Constantinople, the Sea of Marmora, and the Hellespont or the Straits of the Dardanelles; W. by the Archipelago and the Mediterranean; S. by Arabia; and E. by the Persian Gulf, Persia, and Transcaucasian Russia. The space defined by these boundaries has an area of 466,470, or including Habesh, 660,870, square miles, and a population of 16,050,000. When viewed in regard either to its physical features or the wonderful events of which several of its regions have at different periods been the theatre, this portion of the Turkish empire possesses an almost unrivalled interest. It may properly be described as consisting of two plateaus and an extensive plain. The larger and more elevated of these plateaus occupies the whole of its N. portion, stretching across it from the shores of the Archipelago to the frontiers of Persia and Transcaucasia, and comprising within its limits the peninsula of Asia Minor, and the high lands of Armenia and Koordistan. It has an average elevation of from 4000 to 5000 feet, and forms the base of two parallel mountain chains, the Taurus and the Anti-Taurus, which increase in height as they proceed towards the E., presenting many remarkable cones and peaks, several of which rise beyond the line of perpetual snow. The other plateau, that of Syria and Palestine, is also traversed by two parallel ranges, which, breaking off nearly at right angles to the Taurus, proceed S. at no great distance from the shores of the Mediterranean, and are continued almost without interruption across Arabia Petræa and the peninsula of Sinai to the Red Sea. This plateau is less remarkable for its height than for the depression of one of its valleys, which, in the line of the Jordan, is more than 1300 feet beneath the level of the sea.

The extensive plain of Irak and Mesopotamia, forming the lower basin of the Euphrates and Tigris, is bounded on the N. by the Armenian, and on the W. by the Syrian plateau, and though now little better than a steppe, oftener covered with sand than verdure, originally possessed attractions which marked it out for the cradle of the human race, and made it the earliest seat of empire. The drainage of this vast territory, divided into numerous basins by the mountains which traverse it, is carried to four different seas, of which the Persian Gulf receives the largest share by means of the Euphrates and Tigris already mentioned. The Black Sea receives its portion chiefly by the Yeshil and Kizil-Irmak, and the Sakareeyah; while the streams which flow into the Archipelago and the Mediterranean are, for the most part, only mountain torrents. The only lake deserving of notice for its magnitude is that of Van, in the E. of Koordistan, though, for other reasons, a far greater interest attaches to those of Tiberias and the Dead Sea in Palestine. The principal islands are Mitylene, Scio, Samos, Nicaria, Patmos, Cos, Rhodes, and Scarpanto, with Cyprus in the Mediterranean.

The soil and climate present many varieties: in the S. are vast arid plains, but on the river banks and in the valleys of Lebanon the soil is extremely fertile. The summits of Taurus are clad with snow, and their flanks are covered with the vegetation of cold and temperate countries, while the valleys have a temperature almost tropical, and produce the fruits of South Asia. Many of the present arid parts of Turkey in Asia were kept in a state of great fertility in ancient times by means of irrigation, but during the wars which desolated the country for six centuries the canals were allowed to fall into decay, and have never since been repaired. The climate of Anatolia is temperate, and the soil is capable of producing all kinds of grain and fruit. The mountains contain all the useful metals. The chief products are oil, dye-stuffs, medicinal plants, gums, wax, dried fruits, gall-nuts, cotton, silk, wool, goat's hair, leeches, and sponge. [ANATOLIA, ARMENIA, BAGDAD, PALESTINE, SYRIA, &c.]

TURKEY IN EUROPE, the remaining portion of the Turkish empire, is of very limited extent in comparison with its African and Asiatic possessions; but from containing the seat of government, and being more closely allied to great European interests, is the most important of the whole. It occupies the far greater part, and before the kingdom of Greece was dissevered from it, comprised nearly the whole, of the S.E. extremity of the continent, consisting of an extensive peninsula in the form of an irregular triangle, with Cape Matapan for its apex; the E. shores of the Ionian Sea and the Adriatic for one side; the W. shores of the Archipelago, the Sea of Marmora, and the Black Sea for the other side; and the Save, the Danube, and the East Carpathian mountains for its base. The only part of European Turkey not contained within this triangle is Moldavia, which forms an almost isolated projection, stretching N. between the Austrian territories of Transylvania and Bukowina, from which it is separated by the Carpathians on the W., and the Russian government of Bessarabia on the E. Thus defined, European Turkey lies between lat. 39° and 48° N., and long. 16° and 29° 30′ E.; it is washed by the Adriatic and the Ionian Seas on the W., the Archipelago on the S.E., the Sea of Marmora and the Black Sea on the E., and borders N.W. and N. on Austria, N.E. on Russia, and S. on Greece. Its greatest length, from E. to W., measured nearly on the parallel of 45° is 670 miles; greatest breadth from N. to S., from the Pruth on the Moldavian frontier to the vicinity of Gallipoli, 540 miles; area, 203,628 square miles. Population, 15,350,000.

Face of the Country, Mountains, &c.—In respect to physical configuration, European Turkey has been not inaptly compared to a truncated triangular pyramid, which, rising with more or less rapidity from a very extensive base, forms at its termination the lofty plateau of Mœsia. This central plateau, forming a kind of common nucleus for the high lands of Bosnia, Servia, Macedonia, and Albania, is of a quadrilateral shape, and sends off several mountain ranges in different directions. One of these, proceeding N.W. between Bosnia and Herzegovina, becomes linked with a branch of the Dinaric Alps, and thus connects the mountains of Turkey with the Alpine system. Another range, branching off nearly due south, attains, near its commencement in Tchar Dagh, the culminating height of 10,000 feet, traverses the frontiers of Macedonia and Albania, and under the name of Pindus, is continued through Thessaly into Greece. A third range proceeding east, forks on reaching the common junction of Macedonia, Bulgaria, and Roumelia, and forms two distinct branches, one of which, under the name of Balkan, Hæmus, or Emineh Dagh, extends E.N.E. towards the Black Sea, while the other proceeds S.E., under the name of Rhodope or Despoto-Dagh. Besides these principal chains, which form the great water-sheds, and furnish the sources of the most important rivers of the country, there are numerous minor ramifications which often, maintaining a parallelism to the central axis, form a series of descending terraces with intervening valleys, while in other directions the mountainous districts are succeeded first by hills, and then by wide and open plains. Of these plains by far the largest is that of the lower basin of the Danube, embracing the greater part of Wallachia and considerable portions of Moldavia and Bulgaria, and finally sinking down in the latter into the lagoons and pestilential swamps of the Dobrudja, the tract comprised within the last great bend of the Danube, and stretching south from that river to Trajan's Wall, which strikes the shore of the Black Sea at Kustendji. Other plains, far less extensive than the former, though equalling it in fertility and surpassing it in beauty, occur in the S. of Macedonia, the S.E. of Thessaly, and the S.W. of Albania.

Geology and Minerals.—The geology of the country has not been fully or accurately explored. Primary fossiliferous strata occur only in isolated spots, and that part of the secondary formation in which the coal measures are usually found is believed to be altogether wanting. The upper part of the secondary formation, including the cretaceous system, is very largely developed; the limestones, sandstones, and other rocks belonging to it, compose almost the entire stratification of extensive tracts, particularly in the west. Tertiary formations also prevail both in the east and in the basin of the Danube; and along almost all the large rivers, and at the mouths, alluvial deposits of greater or less thickness are usually found. Crystalline schists, composed of gneiss and mica, and chlorite slates are, if not the most largely, the most conspicuously developed of all the rocks, inasmuch as they form the great bulk of the loftiest mountain chains. In connection with the schists, granite also is of frequent occurrence, and is sometimes seen piercing the gneiss at high elevations. No evidence of active volcanic agency anywhere appears, but the important part which it must have performed

in giving the country its final configuration is indicated, both by the existence of thermal springs, and by the masses of trachyte and other volcanic products which cap some of the summits both of the Despoto and the Tchar-Dagh. Many of the veins which traverse the crystalline schists have been ascertained to be highly metalliferous; and lead, yielding a considerable percentage of silver, has at different periods been actually worked. Iron also, of the best quality, is very abundant; but neither the government nor people seem as yet inclined to turn their mineral treasures to good account.

Rivers.—The number and irregularity of the greater and minor mountain ranges render the system of drainage very complicated, dividing it into four principal, together with a great number of subordinate basins. By far the most important is that of the Black Sea, into which the Danube, augmented on the right by the Save, with its tributaries Unna, Verbas, and Drin; by the Morava, Timok, Isker, Vid, and Osma; and on the left by the Schyl, Aloota (Aluta), Argish, Jalomnitza, Sereth, and Pruth, pours the accumulated waters of more than half of the whole country. Next in importance is the basin of the Archipelago, which receives the Salembria from Thessaly, the Indje Kara-soo, Vardar, and Struma (Kara-soo) from Macedonia, and the Maritza from Roumelia. The Adriatic and Ionian seas, properly regarded as only one basin, wash a large extent of the Turkish coast, but owing to the proximity of the mountain chains receive from it no rivers deserving of notice, except the comparatively insignificant Albanian Drin, Scombi, and Vogatza. The fourth basin, the Sea of Marmora, receives only a few mountain torrents. Considering the mountainous character of the country, and its numerous perennial streams fed from snowy heights, it is remarkable that Turkey in Europe does not possess a single lake worthy of the name, with the exception of those of Ochrida in the E. and of Scutari in the N.W. of Albania.

Climate.—The climate is more severe than might be supposed from the geographical position of the country. The Danube regularly freezes, and in the recesses of the highest mountains snow lies during the greater part of the year. It is excessively cold in winter during north-east winds, which are then prevalent, and in the plains of Wallachia and Moldavia the sledge is used as in Russia. The olive will not grow in the latitudes which in Spain and Italy are found to be most congenial to it, and much hardier plants are often nipped by keen frosts after the season has considerably advanced. On the other hand, a great portion of Albania, protected by elevated mountains from the north-east winds, enjoys a delicious climate. Even in the more exposed districts the vintage becomes general before the end of July. No part of the world is better adapted to the production of the ordinary cereals; and the grain at present raised clearly indicates the immense quantities which, under better circumstances, might easily be produced. In the rocky districts of the interior and in the maritime valleys of Albania, the summer is insupportably hot. Devastating storms are frequent in the S., and Albania is liable to be visited by destructive earthquakes. The only exceptions to the general salubrity of the climate are produced by the miasma of some low, swampy tracts of no great extent, and by occasional visitations of the plague. The latter, however, are attributable not so much to the climate as to the complete neglect of sanitary arrangements.

Vegetation, Agriculture, &c.—Owing to the natural

indolence of the Orientals, their pertinacious adherence to antiquated customs, the absence of means of communication, and various other causes, agriculture is still in a very neglected condition, and the country yields a mere fraction of the profitable returns which, under more favourable circumstances, might easily be obtained from it. In many districts, however, the natural capabilities of the soil, and the excellence of the climate, seem to surmount all obstacles, and cotton, tobacco, olives, sesame, rice, maize, wheat, and other crops, are raised in immense quantities. The vine, cultivated extensively, especially by Christians, produces good wines; both the common and finer kinds of fruit and vegetables, which form a principal part of the ordinary food of the Turks, are grown in almost every quarter; the poppy is raised on a large scale for the manufacture of opium; immense numbers of silk-worms are reared on the leaves of the mulberry; and whole gardens are employed in producing flowers for the preparation of the celebrated otto of roses.

A large portion of Turkey is covered with forests: the best oak grows in Servia and Lower Bosnia; the largest forests of fir and pine occur in Bosnia and Upper Croatia.

Animals.—The principal wild animals are the brown bear, found in the wooded mountains between Albania and Macedonia, Bosnia, and the Lower Rhodope, but seldom in the Balkan; the wolf is common; the wild boar, chamois, and stag, abound in the forests; the hare is numerous in Wallachia: these are mostly hunted for their skins. The domestic animals comprise the dog, cat, and hog; sheep form the principal riches of the Wallachian provinces, whence an immense quantity of wool is exported. Goats are more abundant in Turkey than in any other country of Europe. Cattle are extensively reared in Wallachia, Servia, and Bosnia; and the buffalo is common in Wallachia, Bulgaria, and Thrace. The horse of Turkey is small but active; the ass and mule are chiefly employed in Thrace. Trout, &c., are plentiful in the rivers; and leeches, which abound in the marshes, form an important article of export.

Manufactures.—The manufactures are almost entirely domestic; comprising saddles, copper and tin utensils, fire-arms, swords, coarse woollen cloths, and linen and cotton spinning. Silks are manufactured chiefly at Salonika, Seres, and Larissa. Carpets wrought by hand, in the style of the *Gobelins* tapestry, are extensively manufactured in Bulgaria and Servia. The manufacture of cotton goods, at one time the staple branch of industry, carried on to a greater or less extent in almost every town, village, and hamlet, has nearly ceased to exist, from its inability to compete with the products of the power-looms of Great Britain. Embroidery is carried on by females in the south provinces. Tanneries, in which some of the finest kinds of leather are made, are numerous; and distilleries of brandy from prunes are common throughout the country. Filigree work is made in the large towns, and there are powder mills near Constantinople.

Having thus separately surveyed the different territories more or less subject to Turkish sway, the remaining observations will be applicable to the empire considered as a whole.

Population.—The area and population of Turkey are known only by estimates, and not as the result of scientific measurement and of a general census. Enumerations of the people, which took place in 1844 and in 1856, cannot lay claim to any amount of exactness. According to the former return, held to be the more

correct of the two, the total area of the empire, including the tributary provinces, comprises 86,288 geographical, or 1,812,048 English square miles, and the extent and population of the several grand divisions in Europe, Asia, and Africa, are as follow:—

Divisions.	Area in English sq. miles.	Population.	Population to sq. mile.
Turkey in Europe, . .	207,438	15,500,000	75
Turkey in Asia, . . .	660,870	16,050,000	24
Turkey in Africa, . . .	943,740	3,800,000	4
Total, ...	1,812,048	35,350,000	20

The total population, estimated according to the census taken in 1844 (there is nothing reliable later) at 35,350,000, is distributed as follows, in the different divisions of the empire:—

TURKEY IN EUROPE.

Thrace, ...	1,800,000
Bulgaria, . . .	3,000,000
Roumelia and Thessaly, . .	2,700,000
Albania, ...	1,200,000
Bosnia and the Herzegovina, .	1,100,000
The Islands, . .	700,000
Moldavia, . . .	1,400,000
Wallachia, . . .	2,600,000
Servia, ...	1,000,000
	15,500,000

TURKEY IN ASIA.

Asia Minor, or Anatolia, . . .	10,700,000
Syria, Mesopotamia, or Kurdistan, . . .	4,450,000
Arabia, ...	900,000
	16,050,000

TURKEY IN AFRICA.

Egypt, ...	2,000,000
Tripoli, Fez, and Tunis, ...	1,800,000
	3,800,000

Total, ... 35,350,000

The territories of the Turkish empire in Europe are divided into fourteen eyalets, or governments, and subdivided into forty-three sandjaks, or provinces, and 376 kazas, or districts. In Turkey in Asia there are eighteen eyalets, seventy-eight sandjaks, and 858 kazas; and in Turkey in Africa, three eyalets, seventeen sandjaks, and eighty-six kazas.

TURKEY IN EUROPE.

Eyalets.	Chief Towns.	Population of Chief Towns.
1. *Edirné*, or Thrace, . . .	Adrianople,	100,000
2. *Silistria*, ...	Silistria,	20,000
3. *Boghdan*, or Moldavia, . .	Jassy,	50,000
4. *Eflak*, or Wallachia, . . .	Bucharest,	80,000
5. *Widdin*, ...	Widdin,	25,000
6. *Nisch*, ...	Nissa,	10,000
7. *Uskup*, or Roopia, ...	Uskup,	10,000
8. *Syrp*, or Servia, ...	Belgrade,	50,000
9. *Bosnia*, ...	Serajevo,	60,000
10. *Roumelia*, ...	Monastir,	15,000
11. *Yania*, ...	Janina,	30,000
12. *Selanik*, or Salonica, . .	Salonica,	80,000
13. *Djizáir*, or The Islands, .	Rhodes,	30,000
14. *Kyrt*, or Crete, ...	Candia,	20,000

The eyalets of Silistria, Widdin, and Nisch are formed out of the ancient kingdom of Bulgaria; and those of Yania and Selanik comprise the ancient Epirus and Macedonia. The eyalets of Uskup and Roumelia are formed from Albania. The eyalet of Bosnia is composed of Bosnia, a part of Croatia, and of the Herzegovina. The eyalet of Djizáir, or The Islands, comprises all the isles of the Ottoman Archipelago, of which the principal are Rhodes, Cyprus, Cos, Tenedos, Lemnos, Mitylene, Scio, and Patmos.

TURKEY IN ASIA.

Eyalets.	Chief Towns.	Population of Chief Towns.
1. Kastamuni, ...	Kastamun,	12,000
2. Khowdavendguiar, . . .	Brussa,	100,000
3. Aïdin, ...	Smyrna,	160,000
4. Karaman, ...	Koniyeh,	30,000
5. Adana, ...	Adana,	6,000
6. Bozok, ...	Angora,	60,000
7. Sivas, ...	Sivas,	30,000
8. Trabezoun, ...	Trebizond,	50,000
9. Erz-rum, ...	Erz-rum,	100,000
10. Kurdistan, ...	Diarbekhr,	60,000
11. Khabrout, ...	Kharput,	50,000
12. Mossul, ...	Mossul,	65,000
13. Baghdad, ...	Baghdad,	105,000
14. Haleb, or Aleppo, . . .	Aleppo,	100,000
15. Saïda, ...	Beyrout,	50,000
16. Scham, ...	Damascus,	180,000
17. Habesh, ...	Djedda,	18,000
18. Haremi-Nahevi, ...	Medina,	19,000

The eyalet of Kastamuni comprises the ancient Paphlagonia; that of Khowdavendguiar part of the ancient Bithynia, Phrygia, and Mysia. The eyalet of Aïdin is formed from part of Isauria, Lydia, Ionia, Caria, and Pisidia; the eyalet of Karaman contains part of Isauria, Lydia, Pamphylia, Cilicia, Lycaonia, and Cappadocia. That of Adana comprises Cilicia Petræa; those of Bozok and Sivas, Cappadocia; while Trabezoun, or Trebizond, is formed from the ancient provinces of Pontus and Colchis.

TURKEY IN AFRICA.

Eyalets.	Chief Towns.	Population of Chief Towns.
1. Misr, or Egypt, ...	Cairo,	250,000
2. Thrablousi Garb, or Tripoli,	Tripoli,	20,000
3. Tunis, ...	Tunis,	200,000

Constitution and Government.—The fundamental laws of the empire are based on the precepts of the Koran. The will of the sultan is absolute, in so far as it is not in opposition to the accepted truths of the Mohammedan religion, as laid down in the sacred book of the Prophet. Next to the Koran, the laws of the 'Multeka,' a code formed of the supposed sayings and opinions of Mohammed, and the sentences and decisions of his immediate successors, are binding upon the sovereign as well as his subjects. Another code of laws, the 'canon nameh,' formed by Sultan Solyman the Magnificent, from a collection of 'hatti-sheriffs,' or decrees, issued by him and his predecessors, is held in general obedience, but merely as an emanation of human authority. The Koran and the Multeka alone, both believed to be of divine origin, embody the fundamental laws of the state, and prescribe the action of the theocratic government.

A charter of liberties, not yet fully executed, was granted by Sultan Abdul Medjid to his subjects in the 'Hatti-humáyoun' of February 18, 1856. The principal provisions of this imperial order are as follows:—'Full liberty of worship is guaranteed to every religious profession. No one can be forced to change his religion. No legal documents shall acknowledge any inferiority of one class of Turkish subjects to another, in consequence of difference in religion, race, or language. All foreigners may possess landed property, while obeying the laws and paying the taxes.'

The legislative and executive authority is exercised,

under the supreme direction of the sultan, by two high dignitaries, the grand vizier, the head of the temporal government, and the 'sheïk-ul-islam,' the head of the church. Both are appointed by the sovereign, the latter with the concurrence of the 'Ulema,' a body comprising the clergy and chief functionaries of the law. He has the power of objecting to many of the sultan's decrees, and oftentimes possesses more authority over the people than the sovereign himself.

The grand vizier, as head of the government and representative of the sovereign, is president of the 'Divan,' or ministerial council, divided into nine departments, namely—foreign affairs, war, finance, marine; commerce, agriculture, and public works; police, justice, public instruction, and 'vakouf,' or of the domains of the church and of charitable institutions.

The salary of the grand vizier amounts to 1,440,000 piastres, or 13,000*l.* per annum; while the ministers of foreign affairs and of war have 1,080,000 piastres, or 10,000*l.*, and the heads of the departments of finance and marine, 900,000 piastres, or 8200*l.* each a year.

The whole of the empire, except the dependencies in Africa, is divided into governments, and subdivided into provinces and districts. A general governor, or pasha, who is held to represent the sultan, and is assisted by a council, is placed at the head of each government. The provinces and districts are subjected to inferior authorities, under the superintendence of the principal governor. These provincial governors have not now, as formerly, the power of life and death in their hands; and the introduction into many parts of the empire of principles of taxation more in accordance with those of Western Europe, prevents them from having recourse to such a frightful amount of extortion as was formerly practised, although there is still room for great improvement, especially in the more remote districts. All subjects, however humble their origin, are eligible to, and may fill, the highest offices in the state. Birth confers no privilege, as all true believers are equal in the eye of the law.

The present sovereign of Turkey is the thirty-second, in male descent, of the house of Othman, the founder of the empire, and the twenty-sixth sultan since the conquest of Constantinople. By the law of succession, every sovereign has the right to nominate his successor to the throne, within the circle of his own blood relations; but custom has changed this rule, to the effect that not the nearest, but the eldest male heir, may lay claim to the crown. Thus the late Sultan Abdul-Medjid, although he left fourteen children, six sons and eight daughters, was succeeded, not by his eldest son, twenty-one years of age at the date of his death, but by his own brother.

The private income of the sultan is variously reported. Official documents, issued by the minister of finance, state that the civil list amounts to 240,982 purses, or 1,033,882*l.*; but this sum evidently represents only a fraction of the resources of the sovereign. Other accounts fix the personal expenditure of the sultan at 9,600,000*l.*, equal to more than three-fourths of the whole revenue of the empire. The private exchequer of the monarch is encumbered with vast liabilities, notwithstanding frequent attempts at retrenchment. To the reigning family belong a great number of crown domains, the income from which, as well as the customary presents of tributary princes and high state functionaries, contribute to the revenue of the imperial house.

Religion and Education.—The adherents of the various religious creeds of the empire are roughly estimated to consist of the following numbers:—

Religion.	In Europe.	In Asia.	In Africa.	Total.
Mussulmans,	4,550,000	12,650,000	3,800,000	21,000,000
Greeks and Armenians,	10,000,000	3,000,000	—	13,000,000
Catholics, .	640,000	260,000	—	900,000
Jews, . . .	70,000	80,000	—	150,000
Other sects,	240,000	60,000	—	300,000
Total, . .	15,500,000	16,050,000	3,800,000	35,350,000

In this statement, the term Catholic is applied to the disciples of all the Eastern churches which acknowledge the authority of the See of Rome, although there are amongst them numerous differences in the matter of discipline and ceremonial. Of these Eastern Catholics there are:—

1. Latins, or Catholics who use the Roman Liturgy, consisting of Greeks, Armenians, Bulgarians, Croats, and others, to the number of, ...		640,000
2. United Greeks, ...	25,000	
3. United Armenians, ...	75,000	
4. Syrians and United Chaldeans, . . .	20,000	
5. Maronites, under a Patriarch at Kanobin, in Mount Lebanon, ...	140,000	260,000
Total, ...		900,000

The above five religious denominations, together with the Protestants and Jews, are recognized by the Turkish government as independent religious communities, with the privilege of possessing their own ecclesiastical rule. The bishops and patriarchs of the Greeks and Armenians, and the 'chacham-baschi,' or high rabbi of the Jews, possess, in consequence of those functions, considerable political power and independence.

Throughout Turkey, the ministers of religion are subordinate to the civil authorities, who exercise over them the power of diocesans. Magistrates may supersede and remove clergymen who misconduct themselves, or who are unequal to the proper discharge of the duties of their office. The magistrates themselves may also, whenever they think proper, perform all the sacerdotal functions. Owing to the fact that the Koran constitutes the code of law and charter of rights, as well as the religious guide of the followers of Mohammed, there is a close connection between the ministers of religion and the professors and interpreters of the law. Both together form the class of Ulema, governed by the 'sheïk-ul-islam,' the former being called 'mollahs,' and the latter 'muftis.' The members of the Ulema go through the same course of education, based on a thorough knowledge of the Koran and the Multeka; but though they all study together, the lawyers and judges are quite distinct from the clergy, every young man brought up in one of the colleges of the order being allowed to determine for himself, when he has attained a proper age and acquired a sufficient stock of learning, whether he will become a priest, or a doctor of law, or a judge.

The members of the Ulema constitute a form of aristocracy. They pay no taxes or public imposts, and by a peculiar privilege their property is hereditary in their families, and is not liable to arbitrary confiscations. Their persons are sacred; their blood may on no account be shed; nor can they be legally punished in any way but by imprisonment and exile. However, the power and dignity of the ulemas are not hereditary in individuals, but in the order. Formerly they held their offices for life; but about the end of the seventeenth century they were made removable at pleasure, like other

public functionaries. Each individual, however, enjoys all the privileges of the order, independently of his holding any office, or exercising any public employment. Besides the Ulema, there is a priestly class limited to the descendants of Mohammed by his daughter Fatima. These are called Oomra, or Ameers, and are authorized to wear green turbans. They are very numerous, and are found in the lowest ranks of life.

In common with all Mohammedans, the Turks compute from the time of the Hegira, or the flight of the Prophet from Mecca, on Friday, the 16th of July, 622. Their year consists of twelve lunar months, and is consequently shorter than the Christian one. They observe with the utmost strictness the month of Ramadan [RAMADAN] as a prescribed annual fast, during which, from sunrise to sunset, no one eats, drinks, or smokes. The obligation is imposed on all but children and invalids. Owing to the lunar reckoning this month runs through every season in the course of thirty-three years; and when it occurs in the midst of summer the labouring classes suffer extremely from exhaustion and thirst, for not even a draught of water is taken. A recent traveller says, 'I have seen the boatmen lean on their oars almost fainting; but I never saw, and never met with any one who professed to have seen an instance in which they yielded to the temptation of violating the fast.' But at the sunset hour, a moment anxiously expected, and generally announced by the firing of cannon, all classes make up for abstemiousness through the day by revelry through the night. The streets are crowded, and the coffee houses thronged. The mosques are open and the minarets illuminated. Attached as functionaries to the principal mosques are Imaums, Sheiks, and Kiatibs, who are the Friday preachers; the Muezzims, or those who call to prayer; the Dewr Khuran, readers of the Koran; the Naatshuran, singers of hymns; the Rewab, door-keepers, and other inferior officers. In daily life the conversation of the Turks has a strong religious tinge. The ordinary affirmation is *Inshallah*, 'please God,' and the negative *Stafarillah*, 'God forbid;' astonishment is expressed by *Allah kerim*, 'God is great and merciful,' and gratitude by *Shukur allah*, 'may God reward you,' or *Ev allah*, 'praise be to God,' or *Allah raz olsun*, 'may God receive you.'

The Koran and Multeka encourage public education. It is a sacred maxim, that 'the ink of the learned and the blood of martyrs are of equal value in the sight of heaven;' and that the world subsists by four principles, namely, 'the science of the learned, the justice of princes, the prayers of the faithful, and the valour of the brave.' In consequence, public schools have been long established in most considerable Turkish towns, and 'medresses,' or colleges, with public libraries, are attached to the greater number of the principal mosques. But the instruction afforded by these establishments is rather limited. The pupils are chiefly taught to read and write the first elements of the Turkish language; the class-books being the Koran, and some commentaries upon it. In the 'medresses,' which are the colleges or schools of the ulemas, the pupils are instructed in Arabic and Persian, and learn to decipher and write the different sorts of Turkish characters; instruction in a species of philosophy, logic, rhetoric, and morals founded on the Koran; and these, with theology, Turkish law, and a few notions on history and geography, complete the course of study. In fact, even in high life, there is profound ignorance in relation to topics of ordinary knowledge with the humblest grades among the Western nations. Among improvements in public instruction were the foundation of a new university in 1847; and the subsequent organization of a plan of primary and secondary instruction. In 1866 Constantinople had about 400 primary schools, which were attended by 25,000 pupils; and schools of the same description have been established in most other great towns. There are likewise numerous special schools where instruction is afforded in the sciences necessary to the prosecution of the chief military and civil employments, but many of the wealthy Turks send their sons to France and Great Britain to be educated. The Ottoman *Moniteur*, the first Turkish newspaper, appeared in 1832. There are now altogether about twenty in different languages; and although not a reading people the Turks now, like the inhabitants of more civilized countries, repair to the coffee houses, many of which are also barbers' shops, to hear the latest intelligence from the journals.

Justice.—As before stated, the Ottoman empire is governed by a code of laws (Multeka) founded on the precepts of the Koran, the oral laws of Mohammed, his traditions, usages, and opinions, together with the sentences and decisions of the early caliphs, and the doctors of the first ages of Islamism. This code comprises a collection of laws relating to religion, civil, criminal, political, and military affairs; all equally respected as being theocratical, canonical, and immutable, though obligatory in different degrees, according to the authority which accompanies each precept. When a matter occurs which has not been foreseen or provided for by the early promulgators of the law, the sultan pronounces a decision; and his authority is absolute in all matters that do not interfere with the doctrines or practical duties of religion. The Multeka is, however, alone considered as permanent law; the decisions and decrees of the sultan are looked upon as merely emanations from human authority, and, as such, are susceptible of modification or even abolition, remaining in force only during the pleasure of the sultan and his successors. The *adet*, or provincial customs, are allowed considerable influence.

In all the districts and towns of the empire justice is administered by judges (cadis), who are of different ranks, according to the importance of the place in which they are established, each cadi being assisted by a deputy or naib. Nothing can be more simple and expeditious than the forms of proceeding in Turkish courts. Each party represents his case, unassisted by counsellors, advocates, or pleaders of any kind, and supports his statements by the production of evidence. The deposition of two competent witnesses is admitted as complete legal proof in all cases whatever.

The promptitude of Turkish justice has often been praised. No ordinary legal authority could formerly detain an untried man in prison more than three days, and in criminal cases the execution of sentences followed almost immediately on the decision of the judge; but it was found that the time thus allowed was often insufficient to prepare either a defence or accusation, and that the immediate execution of a sentence prevented the power of appeal to a superior tribunal, and consequently took away the only means of getting an unjust decision reversed. In these respects, therefore, great improvements have been effected during the last twenty-five years. Death was formerly awarded for what would be considered in England comparatively venial crimes, as, for instance, unfair dealing on the part of tradesmen; though a butcher or baker convicted of short weight was more frequently subjected to the not inappro-

priate penalty of being nailed by the ear to the door of his shop.

The grand vice of Turkish justice consists in the corruption of the judges and the toleration of perjury. A rich or powerful Turk has in most instances little or no difficulty in obtaining a decision in his favour, however unjust his cause; it being a principle of the law that written testimony is of no avail when opposed to living witnesses. Hence every precaution should be taken to render the latter trustworthy, but instead of this the most detestable perjury is sometimes committed, and magistrates are compelled to decide according to the evidence unless they detect the falsehood at the moment. The decisions of some of the judges are also occasionally procured by means of bribery.

Revenue and Expenditure.—The revenue of Turkey is chiefly derived from taxes of three denominations, the Verghi, the Aashr, and the Roussoumiat. The Verghi, or poll-tax, is a tax on the whole population, paid at a fixed rate for each house or family. The collection is left to the heads of the different communities, whose duty it is to distribute the tax between the rich and the poor according to their means. The second tax, the Aashr, or tithe, is a tax of 10 per cent. upon the produce of cultivation. The third tax, the Roussoumiat, is revenue derived from the farming of the customs, stamps, the sale of animals, taxes on shops, bakeries, butcheries, and mills, and from the rent of lands belonging to the crown.

The revenue for several years past has averaged from 12,000,000*l.* to 14,500,000*l.*, and has generally been exceeded by the expenditure. There is a public foreign debt of over 40,000,000*l.*, the annual charge on which is above 3,000,000*l.*, as nearly the whole of it bears interest at 6 per cent., with a sinking fund of 1 and 2 per cent. A foreign loan was issued in 1865 at 50, but reduced by allowances to 47; and a loan of 1866, offered at the same price, was only partially taken up, the credit of Turkey having fallen very low. Most of the foreign debts are secured by special assignments of revenue. The home debt consists of a great variety of state obligations, amounting altogether to about 20,000,000*l.* Most of it bears interest at the rate of 5 per cent., with a sinking fund of 1 per cent., but the interest is paid very irregularly.

Army and Navy.—The military force of Turkey is divided into—1st, the regular active army, called Nizam; 2nd, the reserve, or Redif; 3rd, the contingents of auxiliaries; and, 4th, the irregular troops. The regular army may be estimated as follows:—

	Regiments.	War-footing.	Peace-footing.
Infantry,	96	117,360	100,800
Cavalry,	24	22,416	17,280
Field artillery,	6	7,800	7,800
Artillery in fortresses,	4	5,200	5,200
Engineers,	2	1,600	1,600
Detached corps, In Candia,	4	8,000	8,000
Detached corps, Tripoli,	2	4,000	4,000
Detached corps, Tunis,	2	4,000	4,000
	80	170,376	148,680

The reserve, or *Redif*, forms a second army, with the same organization as that of the Nizam, and consisting of the same number of regiments of the various arms. These regiments are divided into battalions, squadrons, and companies, and have their standing staffs of officers and corporals on active service, receiving full pay. It is the duty of the latter to live in the towns and villages among the soldiers, who, though on leave, are nevertheless not discharged from the service, and these soldiers they must collect and drill once a week. The Redif soldiers meet every year for four weeks at the head-quarters of their respective corps, and take part in the field manœuvres. While thus on service the men have the regular pay and the usual allowance of provisions.

The auxiliaries consist of the contingents of the tributary provinces. These provinces are—Wallachia and Moldavia, Servia, Bosnia, and the Herzegovina, Upper Albania, and Egypt. The actual number of these troops varies greatly at different periods; and depends on the politics of the time or the enemy against whom they are expected to take the field. In the late war with Russia the number of auxiliaries amounted to about 75,000 men, namely, 30,000 from Bosnia and the Herzegovina, 20,000 from Upper Albania, and 25,000 from Egypt. The irregular troops, which are classed as Bashi-bazouks, Dobrudscha Tartars, &c., amount to about 85,000 men; so that the total military force of Turkey is as near as possible 450,000 men of all arms.

Formerly a considerable portion of the troops were furnished by the spahis and other holders of estates on condition of military service. But that system was changed in 1843, since which time the army is chiefly recruited by conscription. The conscripts are drawn at the age of twenty years; the period of service is limited to five years; and the annual contingent is about 25,000 men. Only one son in a family can be taken as a conscript; and when there is but one son in a family, he is exempted. After five years' service in the Nizam, the soldier is liable to duty for seven years longer in the Redif. A part of the army is procured by enlistment, which is productive of many recruits, as the pay is comparatively high, amounting to 20 piastres, or 3*s.* 6*d.* per month, besides clothing, board, and full rations. The government undertakes the task of procuring substitutes, at a fixed price, for all who wish to avoid the conscription.

The Turkish navy has been entirely reconstructed since the year 1858. Previous to the late war against Russia, the navy comprised six ships of the line, ten frigates, six corvettes, fourteen brigs, sixteen cutters and schooners, six steam-frigates, and twelve other small vessels: total, seventy vessels, manned by 34,000 sailors and 4000 marines. Most of these ships were destroyed at Sinope, November, 1853, and others foundered in storms in the Black Sea. The navy now consists of about forty vessels of the most recent construction, and many of them ironclad.

Trade and Commerce.—It is evident that a country possessed of so many valuable products, and in consequence both of its position and the extent of its coasts and inland seas accessible at so many points, either from W. or E., must, under any circumstances, command an extensive traffic. Until recently, however, commerce was much restricted by many impolitic exactions and the difficulty of land transit. Nearly all the former are now removed, and the government (especially since the visit of the sultan to France and England in 1867) has shown its anxiety to make roads and railways, and thus remove the most serious obstacle to the development of the prosperity of the country. In spite of everything there has been a great increase in the trade and commerce of Turkey within the last thirty years. In 1831 the trade with England amounted to 888,684*l.*; in 1839, to 1,430,224*l.*; in 1848, to 3,116,365*l.*; and in 1866 to 7,768,473*l.* The commercial intercourse between

the two countries during the years 1861 to 1866 is shown in the following table:—

Years.	Exports from Turkey to the United Kingdom.	Imports of Home Produce from the United Kingdom into Turkey.
	£	£
1861	2,636,892	2,987,800
1862	4,261,009	3,487,761
1863	5,301,920	5,714,550
1864	5,663,139	5,977,918
1865	5,423,130	5,677,830
1866	5,304,500	6,349,769

These figures refer only to Turkey proper, and do not include the trade between Great Britain and Wallachia and Moldavia, Syria and Palestine, and Egypt.

The two staple articles of export from Turkey to the United Kingdom, in recent years, have been raw cotton and corn. The latter, consisting chiefly of maize, wheat, and barley, averages rather more than 1,000,000*l.* per annum. The former, which only amounted to 218*l.* in 1860, rose to above a million sterling in 1863 and 1864, but decreased to 550,000*l.* in 1866. By far the most important imports into Turkey from the United Kingdom are manufactured cotton and cotton yarn.

It is estimated that the trade of Turkey with foreign countries amounted, in the year 1866, to 50,000,000*l.*, and that with the provinces to 20,000,000*l.*; giving a total of 70,000,000*l.* per annum. In the order of importance the countries which trade with Turkey are Persia, Great Britain, France, Austria, Russia, and Egypt, the principal commercial ports being Constantinople, Trebizond, and Smyrna. The exports consist chiefly of the surplus of the articles produced and manufactures already noticed, and the imports include nearly every variety of manufactured article, but more especially cotton goods, glass, pottery, arms, paper, cutlery, steel, &c.

Habits and Customs.—The inhabitants of Turkey, consisting of various races accidentally brought into juxtaposition or political relationship by immigration and conquest, present none of the kindred features which combine to form a national character. First in order are the Osmanli Turks, who, as the dominant race, are diffused over the empire, though most numerously in Asia Minor, Armenia, and the S.E. of European Turkey. By right of conquest they are the proprietors of the greater part of the soil, and fill all the civil and military offices. They live generally in towns, are employed in various trades, and never found as agriculturists, except in districts where they have settled in great numbers. Accustomed to obtain their wives and supply their harems from other races, they now constitute a very heterogeneous mixture, retaining few of the leading features of their ancient national character, though the masses are still distinguished by fanaticism and Asiatic indolence, as well as by a certain degree of good-nature, frankness, and hospitality. As a rule, too, the Turks are honest and truthful, and exceedingly temperate both in eating and drinking. Rice, fruit, vegetables, coffee, and sherbet, are the principal articles of consumption. Their temper is essentially phlegmatic, and hence, except on very extraordinary occasions, they never give way to violent bursts of passion. When, however, they do so their fury has no limits, and they become ferocious and brutal in the extreme. Their religion interdicts the use of wine, and though not always respected, this precept has on the whole had a salutary effect on them. Their highest enjoyment is to allow the time to pass indolently and luxuriously away; and their great places of resort

are baths and coffee-rooms. The former, generally handsome, and often magnificent structures, are used universally by both sexes, and all classes; the latter, frequently placed in the vicinity of natural or artificial fountains, shaded by trees, and open to the sky, may be seen crowded at all times by visitors, in the most listless attitudes, apparently deriving the highest happiness of which their nature seems capable from such simple indulgences as a cup of coffee, or a pipe—smoking being a universal habit. Other nations have professed to believe in the doctrine of predestination, but in this respect the Turks alone have given practical effect to their speculative tenets; and their stationary state and long-continued contempt for the inventions and discoveries of others may, in no small degree, be ascribed to a conviction of their inutility, arising from the belief that everything which occurs is determined by an overruling Providence, against whose decisions it would be equally vain and impious to contend. The only striking contrast to their usual phlegmatic manifestations is presented by the general fondness for children, and the strong attachment of children to their parents, particularly to their mothers. Both of these affections are exemplified in numerous ways, but nowhere more impressively than in the deep grief produced by family bereavements, the care bestowed on their cemeteries, and the numerous mourners who are constantly resorting to their cypress shades to bewail their loss. Another graceful characteristic of the Turks is their kindness to animals. The beasts of burden are lightly laden and kindly treated, being very seldom urged by any instrument of punishment. The houses of the Turks are built in contempt of all architectural rules. They are mostly of only one story, very rarely more than two, in height; constructed of wood and sun-dried bricks, those of the better class being plastered and painted over on the outside. The windows, when they open on the street or other exposed situation, are uniformly covered with lattice-work, which prevents any one from obtaining even a glimpse of what is going on within. But though mean and shabby on the outside, the residences of the more opulent Turks are often very sumptuously fitted up in the interior. The most convenient and magnificent apartments belong to the harem, or to the portion of the house appropriated to the exclusive use of the women; and this very frequently opens on a court having a fountain in the middle, and sometimes on a garden. The houses of the poorer classes are most uncomfortable, their windows being generally without glass and their rooms without fireplaces. In winter they are usually heated by means of braziers, or pans of charcoal, which suffocate while they warm.

The personal appearance of the Turks is in general prepossessing; they have dark eyes, an aquiline nose, limbs in general well proportioned, and set off to advantage by a dress which forms a medium between the straight clothing of Europe and the flowing drapery of Asia. Turkish ladies have in general very white delicate complexions, a consequence of their sedentary mode of life, and of their habit of veiling themselves when they take exercise in the open air. Their mode of life and their great addiction to the bath render them rather disposed to *embonpoint*. The gait of the Turks is slow and stately, and their mode of speaking clear and deliberate. The number of the Turks proper is nearly 12,000,000, or about a third of the whole population. To the Turkish stock belong also the Toorcomans, who lead a nomadic life in Armenia and the centre of Asia Minor.

Among the Semitic races the first place is due to the Arabs, who, not confined to their native Arabia, form a considerable element in the population of Syria, Palestine, and the lower basin of the Euphrates, and constitute a great majority in Egypt. More or less allied to them are the Maronites and Druses in Lebanon, and the Jebel-Haooran (Hauran), the Motualis in Cœlo-Syria, the Ansarieh or Nossairi in North Syria, the Nestorians or Chaldeans in the highlands of Kurdistan and Mesopotamia, and the Jews who are scattered over all parts of the empire, but have their favourite seats in Syria and Palestine.

To the Caucasian stock belong the Armenians, who, besides forming at least a third of the population in their native Armenia, are diffused as traders throughout all the larger towns; the Mohammedan Koords, apparently Persian, though their language bespeaks a very mixed origin; the Yezidis, chiefly inhabiting the Sindjar mountains, in the N. of Mesopotamia; the Greeks, forming the bulk of the population in Asia Minor, Thessaly, Macedonia, and the islands, and constituting, to a very considerable extent, the mercantile and trading community of Turkey, more especially in the seaports; the Arnauts in the S., and towards the coasts of Albania; the Wallachians or Roumains, computed at about 4,000,000, who not only occupy Wallachia and Moldavia, but are found under different names in most provinces of European Turkey; and lastly, the races of Slavonic origin, confined exclusively to the European part of the empire, but so numerous as to form almost the entire population of the territories between the Balkan and the Danube, amounting, under the name of Bulgarian Slaves, to about 4,000,000 in Bulgaria and the N. of Macedonia and Thrace, and under the name of Serbs, to upwards of 3,000,000, principally in Servia, but partly also in Montenegro, Bosnia, Herzegovina, and the adjacent parts of Albania. To complete this long list of races, it is necessary to add the Gipsies, widely diffused, and especially numerous in Moldavia and Wallachia, where their condition is one of complete slavery; the Berbers, abounding in Tripoli, Tunis, and part of Nubia; and the negro tribes of Kordofan, Senaar, and Darfoor.

History.—The Turks, according to Dr. Latham, form a branch of the Turanian stock of Altaic-Mongolidæ. They became first known in Europe in the seventh century, when Heraclius, emperor of the East, struck by their prowess and high military qualities, enlisted them in his service; and they gained so much renown by their reduction of Persia, that the Arabian and Saracen caliphs selected them for their body-guards, and afterwards levied their armies among them. They grew more powerful, however, than their masters, whom they elevated or deposed at their pleasure. By this close alliance of the Turks with the Arabs and Saracens they naturally were led to embrace the tenets of Mohammedanism, and gradually became the principal Mohammedan power, usurping the position which the Saracens had formerly held.

The early annals of most nations are shrouded in doubt and obscurity, and a certain degree of mystery attends the actual origin of the Ottoman empire. It is generally affirmed that Genghis Khan, at the head of his troops of hardy, reckless horsemen, issued out of Great Tartary, and conquered for himself the vast and fertile territories of Persia, Asia Minor, and the land bordering on the Caspian Sea. In like manner, Shah Solyman, of Nera, in the year 1214, passed Mount Caucasus with 50,000 men, and penetrated in one direction as far as the Euphrates, in another to the borders of Asia Minor.

Othman, his grandson, made himself master of several districts and towns in Lesser Asia; and in the year 1300, establishing himself at the city of Carachifer, assumed the title of Emperor of the Othmans, calling his subjects after his own name.

Among his numerous conquests, not the least important was that of Prusa, now called Brusa, in Bithynia, which Orchan, his son and successor, made the capital of his dominions. Orchan despatched his sons, Solyman and Amurath, on an expedition of plunder into Europe. The former captured the city of Callipolis, the latter reduced that of Syrilos. In 1360 Amurath, who was a soldier of eminent ability, succeeded to the imperial throne. His reign was a career of conquest and victory. Ancyra, Adrianopolis, and Philippopolis fell before his triumphant arms; and with fire and sword he ravaged Servia, Albania, and Macedonia.

The story of Bajazet is well known, and his life is scarcely less fitted than that of the Swede king, Charles XII., to point a moral and adorn a tale. His reign opened auspiciously, and both in Europe and Asia he won several hardly-contested victories; but in 1401 he was met and defeated by Tamerlane [TIMUR], was taken prisoner, and for awhile confined in a cage of iron. This fatal engagement took place at Angora, July 20, 1402.

Bajazet was succeeded by his son, Mahomet I., under whom the empire in some degree recovered its losses, while its military prestige was fully restored by his successor, Amurath II., who in the year 1444 inflicted a terrible defeat upon the Hungarians at Varna.

The Othman sultans had long conceived the idea of planting themselves on the European side of the Bosporus, and had cast a wistful glance on the fair, rich city of Constantinople, then the seat of the rapidly decaying Byzantine empire. Their advances had been persistent, and managed with the greatest skill, but it was reserved for Mahomet or Mahmud II., a man of haughty spirit and aspiring genius, to realize the dream of conquest. It is said of him that he was inspired with an ambition to emulate Alexander the Great by his perusal of the classic historians, and it is certain that his projects were of a truly colossal character. Crossing the Bosporus, he invested Constantinople with an army of 300,000 men, while the command of the seas was maintained with a fleet of 300 sail. Constantine, the last of the Greek emperors, was not unworthy of his descent from the founder of Byzantium, and defended the 'golden city' for three and fifty days with brilliant valour. But Mahmud knew how to excite the enthusiasm of his soldiers so as to triumph over every obstacle, and Constantinople was carried by assault on the 29th of May, 1453. From that time to the present the Cross has been supplanted on the shores of the Black Sea by the Crescent-symbol of Mohammedanism.

Mahmud, after this important conquest, built the castle of the Dardanelles, and organized the government of the empire. In 1456 he subdued the Morea, and in 1461 led Comnenus, the emperor of Trebizond, a prisoner to Constantinople. The nations of the West, distracted by their own incessant hostilities, gave but little heed to the rapid encroachments of Turkish power, and Pius II. in vain endeavoured to combine Christendom in a new crusade against the infidels.

Bosnia was captured by Mohammed II. in 1470, and Epirus in 1465, after the death of the gallant Iskanderbeg. The Venetians were compelled to surrender Negropont and Lemnos to his victorious arms; he took Kaffa in the Crimea from the Genoese; and in 1473 extorted an acknowledgment of his supremacy from the khan of

Crim Tartary. He then pushed forward his conquests in Europe, and had advanced as far as Otranto, in the kingdom of Naples, in 1480, when death cut short his eventful career. His son, Bajazet II. (1481–1512), seemed to have taken up his father's mantle, and under him the Ottoman empire extended beyond its present limits as far east as the mouth of the Don, and included the provinces north of the Black Sea. His only repulse was that which he received in Egypt, when defeated by the Mamluk sultan at Arbela, 1493. In his reign the power of the Turkish soldiery, to whom the imperial organization assigned a dangerous preponderance, showed itself in an alarming manner, and Bajazet in vain endeavoured to check their pretensions. He was murdered by his son and successor, Selim I. (1512–20), who drove back the advancing Persians to the banks of the Euphrates and the Tigris. He defeated the Mamluks, and in 1517 subjugated Egypt, Syria, and Palestine.

But the greatest splendour of the Ottoman empire was attained under Solyman I. (1520–1566), justly called 'the Magnificent,' and not unjustly 'the Lawgiver,' one of the ablest princes, if not the ablest, who ever sat upon the Turkish throne. In his reign the guns of the Ottoman fleet were heard around the shores of Sicily, and the Crescent flaunted defiance to the Christian Cross in the Bay of Naples. In 1522 he captured the island of Rhodes, after a desperate siege, from the knights of St. John, and in 1526 subdued half Hungary on the field of Mohacz. He exacted a tribute from Moldavia, and in Asia laid the Turkish yoke upon Bagdad, Mesopotamia, and Georgia. While the nations of the West were wasting their strength in fruitless internecine convulsions, his armies crossed the Danube and threatened the existence of Austria, and his triumphant progress was only arrested under the walls of Vienna by the desperate heroism of its inhabitants (1529). His navies, led by the corsair Barbarossa, converted the Mediterranean into a Turkish lake, and his hordes devastated with sword and flame the fair islands of Corfu, Minorc, and Sicily. When he died the power of the Crescent had reached its culminating point; and our forefathers may be forgiven for the terror with which they contemplated a progress so swift and apparently so irresistible. Had Rome possessed her ancient vigour, there can be no doubt that she would have proclaimed a crusade against these dangerous enemies of Christianity and freedom. As it was, the deliverance of Western Europe from the peril that threatened it seems to have been due to the imbecility of the Turkish princes, rather than to any heroic exertions of the Christian sovereigns. After Solyman the Magnificent, the race of Osman gradually degenerated. Most of his successors ascended the throne from a prison, and wasted life amidst the enervating pleasures of the harem, until their career was terminated by poison or the bowstring. Step by step the Ottoman empire has receded from the boundaries that marked its westernmost advance in the middle of the sixteenth century, until it now trembles in its seat upon the Bosporus, awaiting the surely-coming hour—an hour not far distant—when the sultan shall be driven back into Asia, and the last Osmanli shall bid farewell to the shores of Europe.

For while other nations have advanced in the arts of war and peace, the Turks alone have remained stationary, blindly applying the laws of Mohammed to the altered conditions of the present; without a policy either abroad or at home based upon any fixed and intelligible principles. A haughty contempt of the infidel foreigner has until lately been the motive spring of the Ottoman government; and the resources of the rich countries under its sway have been wasted by an imperfect system of administration. The control exercised by the sultan and his divan over the governors of the imperial provinces has either been nominal, or, where real, has only been exercised by fits and starts, when the jealousy of the court has been aroused by the too great power or wealth of some successful vassal. No effort has been made to encourage the introduction of manufactures or the growth of trade and commerce, and political economy is a science of which Turkish rulers to this very day are profoundly ignorant. Rotten within, and incessantly assailed by external enemies, it is evident that the empire of the Ottomans is tottering to its fall.

Selim II. (1566–74), the successor of Solyman, addressed himself to the task of consolidating the vast structure built up by the warlike labours of his predecessors. He made peace with Austria, extorting, however, a yearly tribute of 30,000 ducats as a lien upon Hungary. Desirous of connecting the Don and the Volga by a canal, which would place the Black Sea in direct communication with the Caspian, he attacked Astrakhan, as a point of strategical importance, but was opposed by the Russians, a people previously unknown in Southern Europe, and compelled to retire. In 1571 the naval power of Turkey received a crushing blow by the victory of Don John of Austria at Lepanto. This was one of the decisive battles of the world, for it completely freed Europe from further apprehension of Turkish aggression. Don John had under his command the combined fleets of Venice, Spain, Genoa, Malta, and Pius V., and almost annihilated the Turkish forces.

The first embassy from England reached Constantinople in the reign of Amurath III. (1574–95), who consented to join Elizabeth in an alliance against Philip II. of Spain. He renewed hostilities with Austria, and advanced victoriously to within 50 miles of Vienna, but was then overtaken by severe reverses, and compelled to evacuate Transylvania and Hungary. The decline of the Turkish power became still more evident under Mohammed III. (1595–1604), Achmet I. (1604–17), Mustapha I. (1617–1617, 1622–1623), who was twice dethroned, and Othman II. (1617–22), who was strangled; and though Turkey recovered Hungary, she lost in the east, Armenia, Kurdistan, and Mesopotamia. Under Amurath IV. (1623–40) and Ibrahim (1640–48) the strength of the empire was really directed by the grand vizier Mustapha, and a gleam of success kindled up the Turkish arms. Candia, in 1645, was captured from the Venetians after a struggle of thirteen years, and some of the eastern provinces were recovered from the Persians.

Mohammed IV. (1648–87) was raised to the throne when only seven years of age, and during his minority the sovereign power remained in the hands of that pampered body of privileged soldiery of such evil fame under the title of Janissaries. Fortunately for Turkey, there rose to the head of affairs at this critical conjuncture one Mohammed Köprili, whose military capacity was equalled by his administrative skill. At his decease his son, not less distinguished for genius and energy, succeeded him in the viziership. The losses of the previous reigns were almost entirely recovered by the efforts of these two eminent men; and the Ottomans might have established themselves securely in their conquered territories but for the ambition of their successor, the vizier Kara Mustafa, who invaded Austria, laid siege to Vienna, and was totally defeated by the

Germans and Poles, under King John Sobieski, and Duke Charles of Lorraine (1683). [SOBIESKI, JOHN.]

In 1687 Mohammed was deposed, and succeeded by Solyman II., in whose reign the genius of a third Köprili (Mustapha) secured for the Turkish arms a series of triumphs. Austria was several times defeated, and the war was protracted through the reigns of Achmet II. (1691–1695) and Mustafa II. (1695–1702), until, after the death of Köprili at Salankement in 1691, the Cross once more rose triumphant over the Crescent, and Turkey was forced to conclude a disastrous peace at Carlowitz in 1699. It was in the later campaigns terminated by this treaty, that Prince Eugène first displayed his military genius.

In the reign of Achmet III. (1702-1730), the Morea was recaptured from the Venetians, but this advantage was more than counterbalanced by the loss of Hungary. Charles XII., whom Achmet generously protected after the battle of Paltowa, involved him in a war with Russia. But the czar, although surrounded with his own army, and completely in the power of the Turks, was allowed to escape, through the address of the Czarina Catherine, and the imbecility of the vizier. The peace of the Pruth was concluded, and the only gain to Turkey, who might have stayed for centuries the deed of Russian aggression, was the comparatively unimportant town of Azov. War with Austria followed, and Prince Eugène inflicted defeat after defeat upon the Turks, until his victories of Peterwaradin (1716) and Belgrade (1717), compelled them to sign the treaty of Passarowitz, by which they lost Temeswar, Belgrade, and part of Servia and Wallachia.

Equally unsuccessful was Turkey in her campaigns against Persia; and exasperated by so much ill fortune the people rebelled, deposed Achmet, and flung him into prison. Mahmud I. (1730-1754), recovered Servia and Wallachia (1739), and encouraged his subjects in the peaceful pursuits of commerce. He favoured the introduction of the art of printing into Turkey.

Of Othman III. (1754-1757) we have nothing to record. His successor, Mustapha III. (1757-1774) wisely intrusted the sole direction of his affairs to the vizier, Raghib Köprili, the able scion of a singularly able family. For some years the empire enjoyed undisturbed peace, and under his skilful administration its heterogeneous parts began to gain consistency. On his death the Russians invaded Moldavia, and the Turks, in an imprudent effort to force the passage of the Dniester, lost the picked soldiers of their army. Moldavia and Wallachia were then overrun by the Russians, who captured all their important cities, and threw garrisons into every stronghold. In 1770 the Ottomans suffered another great disaster; their fleet being defeated in the channel of Scio by a Russian fleet, led by English officers. Egypt at the same time revolted, and the Persians made an irruption into the provinces of Asia Minor.

The reign of Abdul Hamid (1774-1784) was clouded by unsuccessful war, and marked by the steady encroachments of Russian power. The Crimea fell into the hands of Russia in 1784. Nor was Selim III. (1784-1807) able to stem the current of disaster. The victories of Suwarof at Bucharest, Bender, and Ismail brought the empire to the verge of ruin, and probably Turkey was never at any time of her career so near destruction. The outbreak of the French revolution, and the consequent changes in Western Europe, however, rendered it necessary for Russia to husband her resources, and she accordingly concluded the treaty of

Jassy (January 9, 1792) with her humbled opponent. This treaty made the Dniester the boundary line between the two empires. The sultan, a man of sagacity, perceived that the misfortunes of his realm were in a great measure due to the lethargy, ignorance, and prejudices of his subjects; and he availed himself of a pause in the long course of hostilities to introduce extensive reforms into every branch of administration. He met with the frequent fate of royal reformers; was deposed and murdered. His successor, Mustapha III., reigned only a year. Mahmud II. (1808–1839) was energetic, courageous, and able. He contrived by a combination of skill and decision to carry out the reforms which his predecessor had inaugurated; and though the successful revolt of Greece, aided by Britain, France, and Russia, deprived him of one of his fairest provinces; though his fleet was destroyed by the combined squadrons, under Sir Edward Codrington, at Navarino (October 20, 1827); though Egypt, under the vigorous guidance of Mehemet Ali, secured a virtual independence, and so threatened Constantinople that Mahmud was forced to invoke the aid of his most dangerous enemy, Russia; yet by promoting internal improvements of great importance, by suppressing the turbulent janissaries, and by introducing into Turkey many of the most beneficial acquisitions of Western civilization, he did much towards arresting the gradual decay of the empire. If Turkey should eventually disappoint the predictions of modern statesmen, and once more consolidate and confirm her power, the astonishing result will be mainly due to the impetus given by the Sultan Mahmud.

The aggressions of Russia attained their climax in the reign of Abdul Medjid (1839-1861), a well-disposed prince, who would fain have continued his predecessor's useful reforms, but for the incessant interference of the Czar Nicholas. The Russian monarch had cast a longing eye on the fair city of the Bosporus, and his wish being father to the thought, had come to the conviction that Turkey was as a 'sick man,' sick unto death. He hinted to Great Britain a desire to share with her the spoil, and when rebuffed by the British government, appears to have resolved upon appropriating the whole. On various frivolous pretexts he suspended diplomatic intercourse with the Porte. On the 2nd of July, 1853, the Russian army crossed the Pruth; a movement which the Turks justly met with a formal declaration of war. Ably led by Omar Pasha the Turkish army crossed the Danube, occupied Kalafat, defeated the Russians at Oltenitza (November 4), and at Citate (January 6, 1854). They were also successful at Karakai (May 30), at Turtukai, and at Giurgevo (July 7); while the Russians, after a month's obstinate siege, were compelled to retire from before Silistria (June 26). Meanwhile England and France concluded a treaty of alliance with Turkey, and an allied army, under Lord Raglan and General Canrobert (who succeeded Marshal St. Arnaud), landed in the Crimea, and invested Sebastopol (October 17), after winning the victory of the Alma (September 20). The siege of Sebastopol was relieved by the brilliant incidents of the battle of Balaklava and charge of the Light Brigade (October 25), the battles of Inkermann (November 5), of Eupatoria (February 17, 1855), and of the Tchernaya (August 16). At first the allied troops underwent great hardships, but on every occasion that they met the Russians their arms were victorious; and the southern city was finally surrendered, September 8-9, 1855. Other operations in the Sea of Azov followed during the year 1855, but with the capture of Sebastopol the war virtually ended and peace was

concluded in April, 1856. The treaty of Paris restored to Turkey a portion of her territories north of the Danube, and to some extent freed her from the dominant influence of Russia.

In 1861 the present sultan, Abdul Aziz, succeeded to the throne. His reign has already been marked by many vigorous financial reforms, by a reorganization of the army and navy, by concessions to his Christian subjects, and by enlightened efforts to promote the progress of civilization. It has also been disturbed by revolts in the Herzegovina, and, recently, by a formidable insurrection in Crete, which, fomented by Greece, and secretly encouraged by Russia, was suppressed in 1867, after a protracted and sanguinary struggle. That year, moreover, was marked by an event unexampled in Turkish history. For the first time an Ottoman sovereign visited the Western coasts, and with his own eyes witnessed the splendid results of our ever-active industry. Abdul Aziz, after a brief stay at Paris, became the guest of the British nation at Buckingham Palace, was warmly welcomed by the people, and entertained by a review in Hyde Park, a ball of unusual magnificence at the Indian Office, and a grand naval display off Spithead. His European tour can hardly be without result. A sagacious observer, he examined closely into the principal sources of the wealth and power of France and England, and returned to his own realms with the conviction that Turkey could only hope to maintain her position by abandoning the antiquated traditions of the past, and resolutely confronting the exigencies of the present.

Languages and Literature.—The Turkish languages form a particular family, which differ from the Arabic, the Persian, the Mongol, and the Chinese. The principal Turkish languages are the following:—

1. Uighur. This language is considered the most ancient and the purest of all the Turkish dialects, and is still spoken in eastern Turkistan, especially in the country between Káshghar and Kámul. 2. The Jagatai is the language of the greater part of Independent Turkistan; and it has a valuable literature. 3. The Kiptshak dialects in the eastern part of European Russia, and in Western Siberia. 4. The Kirghiz. 5. The language of the Turkish tribes in southern Russia. 6. The Turkoman. 7. The southern Siberian dialects, which are very numerous. 8. Chuwash, spoken by the Chuwashes, who live between the Sura and the Wolga. 9. The Osmanli or Turkish, commonly so called, which is spoken by the Turkish conquerors of the Byzantine empire. It is the richest and most polished of all the Turkish dialects. Turkish is now the diplomatic and official language not only of Turkey, but Egypt, Tunis, and Tripoli, and formerly of Algiers. The Osmanlis having received their civilization from the Arabs and the Persians, and the Korán (which among the Mohammedans is never translated from the Arabic into any other language) being still the source of theology and legislation, a great many Persian and Arabic words have gradually found their way into the Turkish language. However, the groundwork of the Turkish language is Turkish, and the Turks pronounce the Arabic words in a much softer way than the Arabs, a difference which is principally remarkable in the pronunciation of the gutturals and the long vowels.

The Turkish alphabet is composed of thirty-three letters, twenty-eight of which are taken from the Arabic alphabet, four from the Persian, and one, the 'Saghir nún' (ن) which is exclusively Turkish. These letters are written from right to left. Turkish is also, and very frequently, written with Armenian characters, especially by the merchants.

The Turkish literature is of ancient origin. During the reigns of Osman and his successors, a great number of Arabic, Persian, Greek, and Latin works were translated into Turkish. Mohammed II. ordered a translation of Plutarch; Solyman I. had the 'Commentaries' of Cæsar translated; and Aristotle and Euclid were translated in the commencement of Turkish history. Mustapha III. made a translation of the 'Principe' of Machiavelli, and of the 'Anti-Machiavel' of Frederic II., king of Prussia. Some of the works of Boerhaave, Sydenham, Bonnycastle, Vauban, Lalande, Cassini, and, in later times, a great number of English, German, and French works on history, geography, medicine, chemistry, mathematics, and the military sciences, have likewise been translated into Turkish. The original literature of the Turks is valuable, though less so than that of the Arabs. They have poets, many historical writers, biographers, and numerous works on morals, divinity, and philosophy.

(Mackenzie and Irby's *Travels in Turkey in Europe*, London, 1867; Farley's *The Resources of Turkey*, 1865; Martin's *Statesman's Year-Book*, 1868; Salname, 1285, or *Official Almanac for the Turkish Empire*, Constantinople, 1868; *Reports* from English consuls in Wallachia and Moldavia, Servia, Bosnia, and Constantinople, received at the Foreign Office in 1866-67; Fowler's *History of Turkey*; Thornton's *Present State of Turkey*; M'Culloch's *Dictionary of Geography*, new edition; Milner's *Gallery of Geography*; *Travels in Turkey* by Admiral Slade, Captain Spencer, and Captain Rhodes; and the *Imperial Gazetteer*.)

TURKEY. [PAVONINÆ; POULTRY.]

TURKEY BUZZARD (*Cathartes Aura*, Illiger, *Vultur Aura*, Linn.).

This species, descriptions of which occur in the works of Marggravius (1678), Sir H. Sloane (1725), Catesby (1771), and other older writers, is spread throughout South America, and the southern portion of the United States. It is common in Jamaica and other West Indian Islands. Wilson describes it as gregarious, numbers roosting together on the limbs of large trees; they may be thus seen in rows, spreading out their wings, to catch the rising sun of a summer morning, and remaining in that posture for a considerable time. They are, he adds, often seen in companies, soaring at an immense height, particularly previous to a thunder-storm. It is doubtful, however, whether this species is truly gregarious. Mr. Waterton observes that though flocks collect to a common feast, they do not form a colony like rooks, but each pair pursues its separate interests. This agrees with the observations of Mr. Darwin, who says, 'the Turkey-buzzard is a solitary bird, or at most goes in pairs. It may at once be recognized at a long distance by its lofty soaring and most elegant flight. It is well known to be a true carrion-feeder. On the west coast of Patagonia, among the thickly-wooded islets and broken land, it lives exclusively on what the sea throws up, and on the carcasses of dead seals; and wherever these animals are congregated on the rocks, there the vultures may be seen.'

In Jamaica this bird is known by the name of John Crow. So valuable are its services in the removal of carrion and animal filth, that the legislature imposed a fine of 5*l.* upon any one who destroyed it within a stated distance of the principal towns. Its ordinary food is carrion, but when hard pressed with hunger it will seize

upon young fowls, rats, and snakes. A highly offensive odour is emitted from the eggs of this species when they are broken.

Nidification, &c.—The Turkey-buzzard has not been known to breed north of New Jersey in any of the Atlantic states. They seek out the swampy solitudes, and, without forming any nest, deposit from two to four eggs in the stump of a hollow tree or log, on the mere fragments of rotten wood with which it is ordinarily strewed. Occasionally, in the Southern states, they have been known to make choice of the ruined chimney of a deserted house for this purpose. The eggs, which are described as being larger than those of a turkey, are yellowish white, blotched irregularly with dark brown or blackish spots, at the larger end chiefly. The male often attends while the female is sitting; and, if not materially disturbed, they will continue to occupy the same place for several years in succession. The young, which are covered with a whitish down, will, like their parents, eject the filthy contents of their stomachs over those who molest them.

Turkey Buzzard (*Cathartes Aura*).

The Turkey-vulture is about 2½ feet in length. The head and upper part of the neck are naked, reddish, and wrinkled; back of the head and of the neck sooty black; plumage glossy brownish black, with green reflexions. This species must not be confounded with the *Gallinaza* (*Cathartes atratus*) of the same region, and which in Peru is protected as a scavenger.

TURKEY-HONE is a slaty, grayish, opaque, soft kind of stone, found in various parts of Europe and Asia. It is composed of silica, lime, alumina, and carbonic acid. When cut and polished, it is used for sharpening small cutting instruments.

TURKEY RED, a fine and lasting dye for woollen cloth and calico, obtained from madder by a series of elaborate processes.

TURKISTA'N means the 'country of the Turk,' and is used to designate a region peopled by the tribes of that race. The name has been applied at different times to different districts. At present it may, in general terms, be said to include Independent Tartary in its widest sense, and is inclosed by Afghanistan and Persia on the south, Asiatic Russia on the north, the Caspian Sea on the west, and the high lands of Central Asia, included in the Chinese empire, on the east. Its area is estimated at nearly 1,000,000 square miles, and the population at about 7,000,000. The country is divided into two unequal portions by the Bolor-Tagh chain of mountains, which crosses it from N. to S. The western portion consists chiefly of low, open, and undulating plains, declining to the great cavity occupied by the Caspian and Aral Seas, and in the direction of the latter the two principal rivers proceed. These are the Amu and the Syr, the 'Oxus' and 'Jaxartes' of the ancients. The Amu, which is the largest river of Central Asia, rises in Lake Sir-i-kol, on the edge of the table-land of Pamir, at the height of not less than 15,000 feet. Tall reeds and sedges, with patches of woodland, line both streams; but in other parts a tree is rarely met with, and the only vegetation is a thin grass. Wastes of loose sand, continually shifting with the winds, small salt pools, and saline marshes, are characteristic of the general surface. Between the Amu and the Syr extends the desert of Kizil-Kum, or 'red sand;' that of Kara-Kum, or 'black sand,' is northward of the latter river, each of them being several days' journey across. The climate is dry and healthy; the sky is usually clear, and of the brightest azure; but great extremes distinguish the temperature; and hurricanes of tremendous violence sweep over the plains, driving along in clouds the sand or the snow, according to the season. In summer the thermometer rises to 108° in the shade and to 144° in the sun; in winter it sinks to from 12° to 25° below zero; the cold is aggravated by strong blasts, and the general want of wood for fuel. Towards the eastern and south-eastern borders the surface is varied by spurs and offsets from the high ranges of the Thian Shan, the Bolor-Tagh, and the Hindu Koosh, where there are well-watered valleys of great luxuriance and beauty. The climate there is not subject to such extremes of heat and cold as the western part of the country.

A region which has such wide limits, and which varies from an elevation of more than 18,000 feet above the level of the sea to about 82 feet below it, must necessarily present a great diversity of mineral treasures, as well as of vegetable and animal life.

Limestone has been met with on the banks of the Kokcha, iron ore in many places, ruby and jade on the banks of the Amu, gold in its sands, turquoises north-west of Bokhara, coal between Kashgar and Kokand, isolated hills of red granite near the Irtish, copper and lead near the river Turgai, and salt in many different parts.

Between Kunduz and Sir-i-kol, at an elevation of from 8000 to 10,000 feet above the sea, a kind of dwarf fir occurs in the valleys. From 10,000 to 12,000 feet the red willow and white poplar are met with. Fruit-bearing trees of the plum genus are found at Langer Kish, 10,800 feet above the sea. Above 12,000 feet the red willow alone thrives, but that hardy plant flourishes as high as Sir-i-kol, 15,000 feet. Groves of tolerably-sized firs are seen in the ravines of the Kulm River, south of Kunduz; but, as before stated, there are no timber trees in the Caspian and Aral hollow plain. The asafœtida plant and the furze of Tartary are the characteristic plants of the mountains south of Balkh. The grass on the pastures around the Sir-i-kol, and on the high lands west of that lake and south of the Amu, is in general very luxuriant. Large quantities of wheat and other grains are produced round Kunduz; and apricots, plums, with other fruits in great abundance and of excellent quality, at Kunduz, Kulm, and Balkh. The almond and pistachio nut are natives of the secondary ranges on the north face of the Hindu Koosh. In the oases of Kulm, Balkh, Serrukhs, Merve, Kurshi, Bokhara, and Khiva, and on the banks of the Gurgan, most kinds of fruit, vegetables, and grain are brought to perfection. Silk is also produced in large quantities in different parts of the region.

The most important animal on the highlands of Pamir is the yak, or kash-gow, a diminutive species of the ox. It is to the inhabitants of Tibet and Pamir what the rein-deer is to the Laplander. The gigantic argali, or mountain-sheep, and the markhor, a large species of goat, are also abundant in the high regions. The wild animals include wolves, foxes, and hares.

Inhabitants.—In Turkistan the predominant race, as its name implies, is the Turk. The Kirghiz, properly so called, inhabit the high table-land of Pamir and its bordering mountains and valleys. They are nomads, and have a bad reputation, even in that region, for their thievish propensities. They are a people of low stature, with Mongolian countenances, though speaking a Turkish dialect. The tribes called Kirghiz by the Russians, whose supremacy they now acknowledge, roam the steppes from the north declivity of Pamir, and southern shore of the Aral to the Russian frontier, and from the Caspian to the Chinese frontier. They are divided into the three great hordes. The Turkomans range the deserts around the Amu and Caspian, from the Ust-urt to the frontiers of Persia and Balkh: they appear, from their lineaments as well as from their language, to be more free from any mixture of Mongol blood than those previously mentioned. The Turkish clans possessed of political power in Khiva, Bokhara, Kunduz, and Kokand are called Uzbeks: in their features they bear a considerable resemblance to the Kirghiz. Among other dwellers in these regions are Afghans, Jews, Hindus, and Persians. The predominant religion among all these tribes is the Mohammedan; but some of the hill Kirghiz are said still to adhere to Shamanism; and Lieutenant Wood, on his journey to the Sir-i-kol, observed many curious traces of lingering impressions from the creed of the Guebres. Agriculture and cattle breeding are the chief occupations of the people, but there are also some rather extensive manufactures of cotton, linen, silk, and woollen goods, shagreen and other kinds of leather, paper made of raw silk, carpets, swords, and knives. Most of these articles are required for the home demand, but the surplus is exported to Russia, China, Persia, and Herat. The prosperity of the habitable parts of Turkistan has, however, always been mainly dependent on its transit trade. Bokhara, the seat of the oldest and best consolidated government in the country, is the principal centre of this commerce. [BOKHARA.] Khiva has a trade of its own with the Turkomans of the Caspian, with Astrabad, and by way of Merve with Meshed. Khokand is an entrepôt of the trade between Bokhara and Kashgar, but it is also visited by caravans from Russia. Kunduz has little trade. Kashgar and Yarkand, lying at the intersection of the great lines of traffic which connect Russia with Tibet and Kashmir, and China with West Turkistan and Tibet, and being moreover situated in productive countries, are the centres of an active and lucrative commerce. The articles imported into Turkistan are chiefly cotton and woollen manufactures, iron, copper, and hardware from Russia, tea and porcelain from China; spices and opium from Persia; cotton shawls, indigo, and spices from Afghanistan; and muslins, brocades, shawls, and sugar from India. The whole of the trade is carried on by means of caravans. The chief political divisions of Turkistan are noticed in the articles BOKHARA, KHIVA, and THIAN SHAN NANLU. The rulers of the whole country have always been exceedingly anxious to prevent any European from visiting it, and several travellers have been put to death for making the attempt. It has, however, recently been explored by M. Arminius Vambery, and to his work 'Travels in Central Asia,' we refer the reader for further information respecting it.

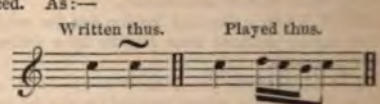
History.—Alexander the Great crossed Western Turkistan from the western termination of the Hindu Koosh by the sites of Balkh, Kurshi, and Samarcand, to the south-west curve of the Sirderia, and appears to have found the region at least as populous and wealthy as at present, and occupied by a number of petty states virtually independent. After the death of Alexander, the Grecian dynasty of Bactria appears to have ruled the country as far north as the Aral till about 120 years before the commencement of the Christian era. The Greek power north of Hindu Koosh was then subverted by Scythians from the east, who were in their turn expelled by the Parthians. In 569 the ambassadors of the younger Justinian found the most powerful of the Turkish tribes seated around the Altai, and Turkish hordes had pushed their encampments as far west as the Caspian. The first princes who inherited the power of Gengis Khan were Mongols; but the Turkish tribes would appear to have predominated in their armies. All the Turkish tribes who have played a conspicuous part in history embraced at an early period the Mohammedan religion; their dialects have in consequence been more or less modified by an admixture of Persian and Arabic, and their historical traditions are those common to all Moslems. The origin of the name Turkoman is difficult to ascertain. The Turkomans are the Turkish tribes who in the eleventh and twelfth centuries crossed the Amu and invaded Persia. The name is common to those who still inhabit Turkistan with many tribes in Persia and the Ottoman empire.

TURK'S CAP, the popular name for the *Lilium martagon* of botanists; a showy ornamental garden flower. It is also applied, but not so generally, to the *Melocactus communis*.

TURMA (Latin), in the Roman army, a division of cavalry, containing thirty horsemen, divided into three decades or decimes, answering to the three equestrian tribes, Ramnenses, Titienses, and Luceres. Each decade was commanded by a *decurio*, second to whom was the *optio*, or lieutenant. Ten turmæ, or 300 horsemen, formed the cavalry complement of every legion.

TURMERIC. [CURCUMA.]

TURN (Ital. *torno*, Gr. τόρνος, Anglo-Saxon, *tyrnan*), in Music, a grace marked ∾, which indicates that the note above it, a tone or semi-tone higher, must be struck shortly, followed by the note itself, and turned from the note before it into the note over which the mark is placed. As:—



TURN-TABLE, a large circular iron plate, fixed on a railway on the level of the ground, provided with a set of rails, and made to move on a pivot. A locomotive, carriage, or truck is run upon it, and the plate being turned round, is then changed to another line of rails at pleasure.

TURNER, JOSEPH MALLORD WILLIAM, our greatest English landscape-painter, was the son of a hairdresser, of Covent Garden, London, and born in 1775. Evincing a very early taste for the higher walks of pictorial art, he entered the Royal Academy as a student in 1789, having previously exhibited his two first drawings —Dover Castle, and Wanstead House. In 1790, a

year after his admission to the academy, he exhibited a View of the Archbishops' Palace, Lambeth, which did not fail to attract public attention; and from this period to the time of his death he contributed every year, with only three exceptions, to the annual exhibitions of the Royal Academy. The number of his pictures, some of them of considerable magnitude and almost all of wonderful pictorial beauty, amounted to 259. For many years he chiefly devoted his pencil to water-colour drawings; and in 1802 he gave an illustration of the extended range his versatile genius was taking, by the exhibition of various subjects representing the different scenes of his travels through Scotland, France, Switzerland, &c. His contributions were The Falls of the Clyde, Edinburgh from the Water of Leith, Ben Lomond Mountains, Kilchurn Castle, The Traveller, Jason, The Tenth Plague of Egypt, Fishermen upon a Sea-shore in Squally Weather, and Ships bearing up for Anchorage. In 1807 he was elected professor in perspective to the Royal Academy, in which situation he continued to deliver lectures to the students for many years. In 1808 he commenced an artistic work, entitled the 'Liber Studiorum,' which is now very rare, and commands a high price. He died at Chelsea, December 19, 1851. By his will he bequeathed to the nation all the drawings and pictures then in his possession, on condition that a room called 'Turner's Gallery' be specially set apart for their reception in the National Gallery, where they are deposited. His life has been written by Mr. Walter Thornbury; his genius illustrated with a copious and loving eloquence by Mr. Ruskin. He was buried in St. Paul's Cathedral, where a monument has been erected to his memory, adjacent to the tomb of Sir Joshua Reynolds.

TURNER, SHARON, was born in 1768. He was brought up to the law, and became an attorney in London. He early began to study the Anglo-Saxon language and literature, and in 1799 published 'The History of the Anglo-Saxons from their first appearance above the Elbe to the Death of Egbert,' with a map of their ancient territory. This volume was followed by 'The Second Part of the History of the Anglo-Saxons, from the death of Egbert to the Norman Conquest,' 2 vols. 8vo, 1801; and 'The History of the Manners, Landed Property, Government, Laws, Poetry, Literature, Religion, and Language of the Anglo-Saxons,' 8vo, 1805. Meantime, while this fourth volume was in preparation, he had published a 'Vindication of the Genuineness of the Ancient British Poems of Aneurin, Taliesin, Llywarch Hen, and Merdhin, with Specimens of the Poems,' 8vo, 1803. He subsequently published a 'History of England during the Middle Ages, from the Norman Conquest to the End of the Reign of Henry VII.,' a 'History of the Reign of Henry VIII.,' and a continuation from the Accession of Edward VI. to the Death of Elizabeth, the whole forming 12 vols. 8vo. He received from the crown a pension of 200*l.* a year. He died February 13, 1847.

TURNERA'CEÆ, the name of a natural order of plants, belonging to Lindley's parietose group of hypogenous Exogens. The species of this order are exclusively natives of the West Indies and South America. The genus *Turnera*, which is its type, was named in honour of Dr. Turner. Don enumerates forty-nine species of *Turnera*, all of which are found in America and the West India Islands.

TURNERITE, a yellowish, translucent crystal, composed principally of alumina, lime, and magnesia, with a small quantity of iron, and a minute portion of silica.

TURNER'S CERATE, in the Pharmacopœia, is also known as *Calamine* ointment. Zinc ointment is now generally adopted as a substitute. *Turner's Yellow*, also called Cassel yellow, and Patent yellow, is the fused oxichloride of lead, reduced to a very fine powder. It is used in preparing yellow oil colour.

TURNHOUT. [Antwerp, *Province.*]

TURNING LATHES have been in use since remote antiquity. Talus, son of Dædalus, is supposed to have invented them (1240 B.C.). Mention is made in the Old Testament of the potter's wheel, in which the axis is vertical, not horizontal. Pliny, crediting Theodore of Samos as the inventor, refers to one Thericles as famous in the art. We are told, moreover, that the ancients commonly observed, when anything was done accurately and delicately, that it was as if it had been turned within the lathe. But if the lathe had much importance in those times, its value to the modern mechanic is incalculable. The most delicate articles of luxury and ornament are produced by it. It is a most important adjunct in the manufacture of the steam-engine, and is equally needful in the fabrication of those machines in which the circle, or modifications of it, are discovered.

There are various forms of lathe. In the *centre-lathe*, the work is supported at both ends; in the *spindle*, *mandrel*, or *chuck lathe*, it is fixed on the end of a spindle. The *pole*, the *hand-wheel*, and *foot-wheel lathes* derive their name from the manner in which they are put in motion. The *power lathe* is used only for powerful work, and is turned by water, steam, or horse-power. *Bed-lathes* are those used by the turners in wood; *bar-lathes* are principally for metal work; and the *turn-bench* is the metal centre-lathe employed by watchmakers. But certain characteristics are common to all lathes. Thus, for outside work, it is essential there should be two *points*, to sustain the work at each end, and to allow it to turn freely on its axis; secondly, a rest or support for the tool; and thirdly, an instrument for causing the work to revolve. In inside work, the essential requisite is a spindle or mandrel, to which the work is fixed, by which it is turned round, and by whose means the tool, being applied to the free end of the work, produces a hollow or excavation.

In the operation of turning, also, there are certain particulars common to all lathes. The work to be reduced to shape is put into the lathe, and, revolving on an axis with a circular motion, is brought into the intended form by means of tools presented to it and held fast upon a fixed rest. The projecting parts of the work are thus pared off, and the outer surface is so reduced as to be equal in distance from the axis in motion, and to possess a circular shape. The work may also be turned hollow with a cavity inside; the exterior surface may be grooved or fluted, or in fact turned to any shape; or the work may be turned in or out.

We pass to a detailed description of the centre-lathe, employed in forming the outside surface of the work; and of the mandrel-lathe, arranged for turning hollow work.

The most simple of the two, the centre-lathe, consists of two beams of wood fixed horizontally on legs like a bench, forming the bed of the lathe. The beams, says an authority on the subject, are fixed a small distance asunder, the space between them being for the reception of the tenons at the lower end of the *puppets*, or short posts, which rise perpendicularly from the bed, and are firmly tied thereto by means of cross wedges passed through the tenons beneath the bed. One of the puppets carries an iron pin, and the other tenon has, at the same level, a centre screw working through a nut. Both the screw and the pin are furnished with sharp steel

points, which pass into the ends of the work and fasten it securely. A rail or bar, extending from one puppet to the other, and lying on hooks projected from the puppets, supports the tool. The whole is put in motion by a treadle, to which is fastened a piece of catgut, passing two or three times round the work, and attached to the elastic *lath* over the head of the turner.

Motion is communicated to the instrument by the workman, who, pressing his foot upon the treadle, causes the work to revolve rapidly; unwind the cord towards the treadle, and wind it up on the side near the pole. Meanwhile the workman places a gouge or chisel on the rest, and by the motion of the catgut gives to the work a circular form. But after each pressure of the treadle he removes his foot, and the reaction of the bent pole causes the work to roll back until the pole becomes straight again. During this revolution, of course, no cutting is done.

The advantage of this lathe is sufficiently conspicuous, but its working necessitates much loss of time; and although its great simplicity renders it very useful to carpenters in the manufacture of the legs of stools, &c., yet it is generally superseded in favour of the foot-lathe.

More complicated, but more useful than the preceding, is the mandrel-lathe. This machine has two uprights of oak or mahogany, on which it supports the bed, consisting of two bars of iron with a space between them. A cast-iron frame is fastened to the bed, in order to support the spindle or mandrel; whilst the work is supported at one end by the extremity of the mandrel, and at the other by the back puppet. This puppet is fitted by a cylindrical pin, of which the conical point supports the work; and the back centre can be moved forward by means of the screw, while a clamp screw binds the pin when adjusted. A tenon, entering the groove through the bed, secures the puppet; and a screw descends from the tenon through the bed and projects beneath it. On this screw a nut is tapped, by turning which the shoulder of the puppet is drawn down firmly to the bed, and which, when loosened, allows the puppet to be slid along the bed and adjusted to the length of the work. The point of the back centre must be exactly in the centre line of the axis of the motion of the spindle; consequently, the upper surface of the bed must be straight and level, and the groove exact and parallel. It is necessary, also, that the mandrel should be so fixed to the bed that its centre line is exactly parallel to the bed and to the groove. Its neck must be accurately fitted to the collar; at one end it projects beyond the collar, and the projecting part is formed of a screw for fixing the work to it. Upon this screw various pieces called *chucks* are fixed, each chuck being adapted to hold a different piece of work. The mandrel, writes our authority, is turned by a catgut band passing round the pulley and the large iron foot-wheel attached to the end of the axis. This axis has a crank in the middle, united by an iron link to the treadle, which is fixed by three rails to an axis on which it moves. Motion is accorded to the lathe by the foot of the workman, which should rise and fall with the treadle, his body remaining steady all the time.

Before placing the wood to be rounded in the lathe, it is rounded with a small plane or rasp. Its centres must also be found, so that when the centre points of the puppets are applied to them, they may be exactly opposite each other. When the work is turned and the ends made flat, it is polished; if soft wood, by shark skin or Dutch rushes; if ivory or bone, by pumice-stone or chalk; if metal, by tripoli and putty-powder.

Various tools are used by turners. Gouges are employed to rough out and form the wood; chisels to smooth and reduce it to its proper form. In turning hard woods, ivory, or bone, the cutting edges of the tools are bevelled on one side only. The turner also employs callipers for inside and outside work, and gauges to regulate the dimensions of his work. Chucks of all sorts and sizes are used; and the milling tool, on which a pattern has been cut, is employed to impress it upon the wood.

The Whitworth Company (of Manchester) have constructed a self-acting tool lathe, of which we give the front elevation in the Plate 'Turning Lathe,' affixed to this volume. Besides possessing additional contrivances for cutting screws, this lathe comprehends all that distinguishes the common lathe by the same Company. The slide rest, W, is arranged to travel along the shears, H, by means of a longitudinal screw, inside the shears, which works in a nut on the under side of the slide rest. The shaft of the screw projects at *a*, and carries on its end a spur wheel, *b*, by means of which it is driven. A pinion, *c*, is fixed on the projecting end of the chuck spindle, L; and this pinion drives the spur wheel, *b*, by means of an intermediate spur wheel, *d*, and pinion, *e*. These latter two are fast together, and are carried loosely on a stud pin, *f*. They may be changed for wheels of various sizes in order to suit whatever rate it is proposed to give the longitudinal motion of the slide rest, as compared with the rotation of the chuck. The stud pin, *f*, is bolted to an adjustable bracket-piece, *g*, which can be so set that it can accommodate the various sizes of the wheels. The slide rest, W, may be disconnected from the screw by means of the handle, *h*, and can be shifted along the shears by means of the handle, *i*, and screw wheel, *j*, which works in the screw inside the shears. The screw, Z, for moving the tool transversely, has fixed on it a small disc, which is graduated round the edge, so that the operator, with the greatest accuracy, can determine the depth to which he cuts any screw thread he may be at work upon. This lathe is calculated to be of infinite use to amateurs, opticians, and the producers of small articles of circular contour.

(For information on the subject of Turning, see Tomlinson's *Cyclopædia of the Useful Arts*; Rees' *Cyclopædia*; E. de Valicourt's *Nouveau Manuel Complet du Tourneur*, Paris, 1848; Holtzapffel's *Turning and Mechanical Manipulations*, London, 1847; Ibbetson's *Specimens of Excentric Circular Turning*, London, 1838; the *Handbook of Turning*; and the *Mechanic's Magazine*.)

TURNIP (Anglo-Saxon, *rape*; Lat. *rapus*, the common name of the *Brassica rapa*), in its wild state is a native of Great Britain, and is frequently found in the borders of fields and waste places. By cultivation the size of the plant, especially the root, is sometimes enormously increased. The young leaves and buds are gathered and eaten under the name of 'turnip-tops.' The roots consist of a large mass of soft cellular tissue, in which starch and sugar are deposited. The root of the turnip contains a large proportion of water. Dr. Lyon Playfair, in an analysis of the food of cattle, made at the request of the Royal Agricultural Society, gave the following as the ingredients in 100 parts of turnips:—

Water,	89
Unazotized matters (starch and sugar),	9
Albumen,	1
Inorganic matter,	1
	100

The turnip as a culinary root has been prized from the earliest times, and many varieties have been cultivated for the table; but it is those of a larger kind, cultivated in the fields, which form so important a part of the most improved systems of agriculture on all light soils, that the success of the farmer is in general proportioned to the quantity raised on his farm. They are the great foundation of all the best systems of cropping, by supplying the manure required for the subsequent crop, and, at the same time, clearing the land of all noxious weeds, by the numerous ploughings, stirrings, and hoeings which they require.

The early vegetation of the seed is essential to a good crop. In its young and tender state it is liable to a variety of accidents. Its great enemy is the turnip-fly. [Turnip-Fly].

In order to have a heavy crop, especially of Swedish Turnips, or *Ruta Baga*, it is advisable to sow the seed early, that is, in the beginning or middle of May. They will then have the advantage of the summer showers, and be beyond the reach of the fly in a very few days; and when the dry weather sets in they will already have a supply of moisture in their roots, and the fibres having struck deep, will not suffer any check.

The White Norfolk Turnip and its varieties should be sown about midsummer, to have a good and heavy crop before winter. The distance at which they may be left in thinning them out must depend on the variety, whether it has a wide-spreading top or not. The best crops, both of swedes and common field turnips, are generally those which have the tops vigorous and moderately spreading. A small top will not nourish a large bulb; but when the growth is chiefly in the leaves, the bulbs are seldom large.

It is advantageous to have different varieties of turnips, which will come to perfection in succession; and it is useful to sow some at different times for this purpose. The small turnip, which from its rapid growth is called the Nimble Turnip, may be sown as late as the end of August, and in mild seasons will produce tolerable bulbs in winter and early in spring. The frost will not injure a growing turnip so readily as one which is come to perfection and whose leaves are withered.

There are so many varieties cultivated, that it is difficult to enumerate them. The Swedish Turnips may be classed according to the colour and size of their tops and the shape of the bulb. The best have but little stem rising from the bulb, and a good tuft of leaves. The substance is of a bright yellow and has a strong smell, especially when they have been kept some time. No frost will hurt them, if they are kept dry: but alternate rain and frost will hurt them. The common Norfolk Turnip is round and flat, the bulb being half buried in the ground; it throws out no fibres, except from the slender root which proceeds from the centre of the bulb. The Globe Turnip takes its name from its shape; it rises more out of the ground, and grows to a greater size. It is on the whole the most productive and hardy.

Turnip-seed is often raised in the gardens of cottagers, whose children keep off the birds, and it is a branch of industry which every farmer should encourage. He can readily see that good bulbs only are used, and he secures the seed he wants, while the cottager is well paid for his trouble. This is perhaps the most convenient mode of raising the seed on a large farm. If it is kept in a dry granary, it will be good for several years. It is, however, best to use fresh seed, as it always germinates sooner. The seed is seldom steeped, but generally drilled in the rows by a drill-barrow or more perfect sowing-machine. The best farmers, even on land well manured and in good heart, sow with it some artificial manure, as bones, rape-cake, or rich dried compost, to accelerate the first growth of the plants. Machines which sow the seed and manure in drills at the same time, may be had of most of the manufacturers of improved agricultural implements.

TURNIP-FLY or FLEA, a name popularly applied to the *Haltica* (or *Altica*) *nemorum*, a little insect belonging to the order *Coleoptera*, which annoys the farmer by destroying his crop of turnips, when in the early stages of their growth. The species of the genus *Haltica* are remarkable for their power of leaping, which is effected by means of the peculiar formation of their very thick hind legs. They are among the smallest of beetles, and are variously coloured with green, brown, or yellow, often brightly shining. Some destroy the cabbage, others flax, others tobacco or hops; but the turnip is the greatest sufferer from the ravages of these little creatures, which, though small in size, are many in number. They love sunshine, warmth, and fine weather, and eat away the surface of the young leaves of the plant with voracity. The larva feeds within the full-grown leaf, in which the egg has been laid and attached by its parent, but does little or no mischief to the growth of the plant. It is the beetle which destroys the first smooth leaves or cotyledons of the turnip. It scents out the turnip crop from a great distance, and flies towards it even against the wind. It feeds by night, and during the day retires under the cotyledon. The parent insects are to be seen in the earliest fine days of February, and do not disappear before the end of October, but they do not feed much after the latter end of September. There are five or six broods of these in a summer. Besides the *Haltica nemorum*, which is of a shining black, with a yellow stripe down each elytron, the *Haltica similis* and *H. flava* are also destructive to turnips.

The destruction caused by these insects may be conceived when, so long ago as 1786, Mr. Young stated that the turnip crop destroyed in Devonshire alone was valued at 100,000*l.*; consequently many entomologists have directed their attention both to the inquiry into the habits of the animal, and the finding a remedy for the mischief it causes.

Among the remedies which have been proposed are fumigation, watering with weak brine, steeping the seed in brine, applying lime and soot to the land, the application of wormwood decoction and road dust, burning the soil, letting the prepared land lie for a fortnight before sowing, sowing turnips only after a stubble crop, using ammonia as a manure, brushing the turnips by a machine with a new tarred board above it, to which the turnip flies adhere when they touch it, &c.; though the last method in which a tarred or newly painted board is used, or a fine net employed to take the fly, is, on the whole, most satisfactory. Yet it is very doubtful whether we have discovered any efficient means of opposing this mischievous little beetle. Strictly speaking, the term Turnip-fly should be applied to the *Athaba centifolia*, and Turnip-flea to the more injurious *Haltica nemorum*.

TURNPIKE TRUSTS. Turnpike roads are a peculiar species of highways placed by the authority of Acts of Parliament under the management of trustees or commissioners, who are invested with certain powers for the construction, management, and repair of such roads.

Besides the various local Acts, there are several Acts of Parliament called General Turnpike Acts, the provisions of which extend and apply to all existing and

subsequent local Acts. The subsisting enactments upon this subject are contained in 3 Geo. IV. c. 126, which repeals former General Turnpike Acts; 4 Geo. IV. c. 16, c. 35, c. 95; 5 Geo. IV. c. 69; 7 & 8 Geo. IV. c. 24; 9 Geo. IV. c. 77; 1 & 2 Will. IV. c. 25; 2 & 3 Will. IV. c. 124; 3 & 4 Will. IV. c. 80; 4 & 5 Will. IV. c. 81; 5 & 6 Will. IV. c. 18, c. 62; 3 & 4 Vict. c. 39; 4 & 5 Vict. c. 51; 14 & 15 Vict. c. 38; 23 & 24 Vict. c. 73; 24 & 25 Vict. c. 46; 12 & 13 Vict. c. 46; 26 & 27 Vict. c. 94; 29 & 30 Vict. c. 92, c. 105. The General Highway Act (5 & 6 Will. IV. c. 50) also contains certain provisions applicable to turnpike roads; but by the 113th section does not extend to them except where expressly mentioned.

The trustees of turnpike roads consist of persons nominated for that purpose in the Local Acts, who must be persons possessed of a certain property qualification, and of the justices of peace of the county or counties through which the roads pass; but all persons who are contractors or otherwise personally interested in the roads are disqualified from being trustees. (3 Geo. IV. c. 126, s. 61, 62, *et seq.*) They are exempt from personal liability for acts done in pursuance of their powers, and may sue and be sued in the name of their clerk. (7 & 8 Geo. IV. c. 24, s. 2 & 3; 3 Geo. IV. c. 126, s. 74.)

The General Turnpike Act for Scotland is 1 & 2 Will. IV. c. 43 (1831); and 8 & 9 Vict. c. 41 (1845). (Sheriff Barclay's treatise on *Highways*, 1860.)

In Ireland, since 1857, the roads have been kept in repair by an assessment on land, and not by tolls. The Isle of Man also is overspread with excellent roads, with no tolls upon them. The financial management of roads by trustees in England and Scotland has proved eminently unsuccessful, there being an accumulation of debt on the turnpike roads in England and Wales to the amount of nearly four millions sterling, and in Scotland to two millions and a half. Several Scotch counties have, however, obtained local acts for abolishing toll gates, and maintaining all their roads and bridges by assessment on lands and heritages. The question of toll-bar abolition has been much agitated in England, and the Anti-toll Association of London has succeeded in freeing most of the suburbs of the metropolis from toll gates, and substituting a general rate. In 1867 a select commitee of the House of Commons, to whom a turnpike trusts bill was referred, agreed in the recommendation 'that in any future legislation on the subject of Turnpike Trusts it will be expedient to alter and amend the Highway Acts, so as to provide an uniform system of road management throughout the country, and that the maintenance of all roads should be provided for by a rate levied on districts.'

The returns from turnpike trusts in England and Wales for the year 1865 show that the receipts from tolls amounted to 997,960*l.*, a decrease of 11,078*l.* as compared with the receipt from tolls in 1864. The expenditure in the year for repairing the roads, including aid obtained from the parishes, amounted to 599,426*l.* The above figures do not include returns under the Local Government Act, or the Metropolis Local Management Act, nor places under improvement Acts; a very large addition would, therefore, have to be made to the sum named if the maintenance of streets in towns was to be included. The sum of 31,972*l.* was expended on improvements. The interest of debt paid amounted to 117,763*l.* The bonded or mortgage debt was reduced (notwithstanding an increase of debt in the year to the extent of 20,912*l.*) from 3,942,153*l.* at the end of 1864 to 3,756,258*l.* at the end of 1865, a net decrease of 185,895*l.*; 62,212*l.* was paid off at par in 1865; 47,924*l.* was accepted in payment of debts of 49,160*l.*, equal to a reduction of 2*l.* 10*s.* 3*d.* per cent.; 47,667*l.* paid off debts amounting to 60,591*l.*, a reduction of 21*l.* 6*s.* 7*d.* per cent.; 7919*l.* paid off debts of 15,838*l.*, a reduction of 50 per cent.; and 1960*l.* paid off debts of 6901*l.*, a reduction of 71*l.* 11*s.* 11*d.* per cent. This statement may give some idea of the value set upon the debt by the mortgagees under the circumstances of the various trusts. The unpaid interest at the close of 1865 amounted to 456,708*l.*, a decrease of 42,145*l.* as compared with 1864. These arrears are confined chiefly to a few trusts, more than three-fourths of the amount being due upon forty-six trusts which appear to be in an insolvent condition, since their mortgage debt is 367,477*l.*, and the unpaid interest 365,739*l.*, whilst the tolls of the year amounted to only 26,449*l.* Taken as a whole, the accounts show that the state of the trusts is gradually improving, but there are many the condition of which is very unsatisfactory. On 291 trusts no debt has been paid off for three years; on 225 trusts none for six years; on 191 trusts none for ten years; and on 141 trusts none for fifteen years. In the year 1865 there were 182 trusts with no debt. Their toll income was 210,238*l.* The other 864 trusts, with a toll income of 787,722*l.*, had bonded debts amounting to 3,756,258*l.* Of these trusts, 125, with a toll income of 167,936*l.*, had bonded debts amounting to only 81,303*l.*, or less than half the year's revenue from tolls. Forty-seven, with a toll income of only 3125*l.*, less than 100*l.* each, had mortgage debts amounting to 96,547*l.*, and unpaid interest 44,226*l.*; in many of these cases the payment of the bonded debt must be regarded as hopeless. On the remaining 692 trusts the total income of 1865 was 616,662*l.*, and the debt 3,578,408*l.* Two hundred trusts have debts of 1000*l.* or under, 157 above 1000*l.* and under 2000*l.*, 278 above 2000*l.* and under 5000*l.*, 136 above 5000*l.* and under 10,000*l.*, 67 above 10,000*l.* and under 20,000*l.*, and 26 above 20,000*l.*

TURNSOLE, a peculiar purple dye-drug, the inspissated juice of the leguminous plant *Crozophora tinctoria*. It is mixed with ammoniacal matter and exposed to the air for a short time; after which very coarse linen rags, previously prepared by bleaching and cleansing, are dipped into it. The rags are used as the colouring material.

TURNSTILE, an ingenious apparatus, used at the entrances of public exhibitions and at the ends of toll-paying bridges, which acts, by a revolving motion, as a register of the number of passengers, and the amount received by the money-takers. This machine can only rotate in one direction, and only one person can pass at a time. Until the money-taker presses his foot on a lever the turnstile cannot rotate at all; but directly the passage is effected, the lever is allowed to drop, and the turnstile is again locked. The movement is effected by means of a toothed wheel to the extent of one tooth; and the attendant has to account for the money received according to the number of wheel teeth which have been moved during the day.

TURNSTONE, *Strepsilas interpres*, a bird of the *Charadriadæ* or Plover family, which is found in almost every part of the globe, but in the United Kingdom as a winter visitor. It owes its common English name to its habit of turning over stones on the sea-shore in search of food. Its bill is longer than its head, and conical; its tail is short and pointed; the feet have a short hind toe; the wings are short; and its whole length

measures 7 or 8 inches. The upper parts are of a reddish-brown, spotted with black; the lower, white; part of the neck and breast, black.

TURPENTINE. The well-known liquid to which this name is now so commonly applied, is only the volatile portion of turpentine properly so called. True turpentine is an oleo-resin, of about the consistency of honey. It flows naturally, or by incision, from the wood of most coniferous trees, such as pine, larch, fir, pistachia, &c., and by distillation yields spirit, essence, or volatile *oil of turpentine*, the non-volatile portion being common *resin* or *colophony*. [RESINS.] Oil of turpentine is very largely used in the preparation of paints and varnishes, in medicine, and also, when rectified, for burning in lamps, under the name of camphine. For medical purposes it is re-distilled with caustic alkali, acid matters and traces of resin being thereby removed. The imports of crude turpentine into the United Kingdom in 1866 amounted to 72,146 cwts., value 35,771*l.*, of which Greece supplied 6640 cwts., France, 10,048 cwts., and the United States, 52,668 cwts. Of oil of turpentine, 118,483 cwts., value 238,546*l.*, were imported, nearly all from France and America. In the same year 87,905 cwts., value 17,840*l.*, of British turpentine in a crude and refined state were exported, in addition to 1368 cwts., value 275*3l.*, of foreign oil of turpentine.

TURPENTINE TREE, the name given to some of the species of the genus *Pistacia*, which belongs to the natural order *Anacardiaceæ*, and is known by the possession of diœcious flowers, which are without petals.

The Venetian Turpentine tree, or Turpentine Pistachia tree, *P. terebinthus*, grows to the height of about 30 feet. The fruit is round, not succulent, and somewhat furrowed, and when ripe of a dark blue colour. Its leaves and flowers emit a very heavy resinous odour. It is a native of the south of Europe and the north of Africa, and was introduced into this country about 1656: it is not, however, common. One of the finest specimens in Great Britain is growing in the Chelsea Botanic Garden. The Chian or Cyprus Turpentine is procured from the *Pistacia terebinthus*. The Mount Atlas Mastic, or Turpentine tree (*P. Atlantica*), is a deciduous tree, growing in Barbary, not far from Mount Atlas. It is also, with the last species, found in the island of Scio (Chios) and about Constantinople. When cut into, it yields a large quantity of resinous matter, very much resembling mastic. The Moors eat the fruit as they do that of the date. The Mastic tree (*P. lentiscus*) is evergreen, attains a height of about 20 feet, and is a native of the coasts of the Mediterranean. The Pistachia-nut tree (*P. vera*) attains a height of about 20 feet, and is a native of Syria. It yields the Pistachia nut, and for this purpose it is cultivated in the south of France and Italy. [PISTACIA.]

TURQUOISE. This mineral occurs in botryoidal masses; it has a greenish-blue colour, and is usually opaque. It is found in alluvial clay in Persia exclusively. It consists of phosphoric acid, 31; alumina, 45; oxide of copper, 3·75; oxide of iron, 1·25; water, 19.

TURRET (from the Latin *turris*) is used as the diminutive of tower, and denotes that what is so described is small in comparison with the main structure, of which it forms a part. Turrets are frequently attached to one or more of the angles of a tower, and contain a winding stair leading to the roof. Sometimes they are formed on the upper part only of a building.

TURRET SHIP, a species of iron-plated vessel, elevated but slightly above the water, and carrying in the middle of the deck one or more iron-clad turrets, armed with heavy guns, and made to revolve with considerable speed, so that the guns may be fired in any direction. There are two varieties of turret ships: one invented by Captain John Ericsson, of New York; the other patented in this country by Captain Cowper Phipps Coles, R.N. The former is known as the *Monitor* system, from the name of the vessel in which it was first carried out. The design was originally submitted to the Emperor Napoleon by Captain Ericsson, in September, 1854, and was the result of experiments and investigations extending over a period of twenty-eight years. Captain Coles first conceived the idea of building impregnable vessels in 1855; his idea, however, being limited to the construction of a raft, with a gun placed upon it, and defended by a shield. He submitted his notion to the British Admiralty, but it was not favourably received; and subsequently Mr. Brunel suggested to him the desirability of placing both gun and shield upon a turn-table. Drawings of a shield fitted to a turn-table were produced by Captain Coles in March, 1859; and in December, 1860, he published designs of his gun, shield, and rotatory platform in *Blackwood's Magazine*. Nothing, however, was done, either in England or France, to develop the idea, until the American war practically proved the success of Captain Ericsson's invention. The *Monitor*, constructed by that ingenious officer, proved a seaworthy and powerful vessel; but its successors, on the same principle, are still more effective; and the objection often urged against them that they would be incapable of accomplishing long sea-voyages, has been satisfactorily disposed of by the cruise of the *Miantonomah*, which has visited Europe. The Monitor vessels are described as the healthiest in the American fleet, as the most popular among the seamen, and as readily answering the helm. Most of them are fitted with 15-inch and 20-inch cast-iron guns; but the American government contemplates the construction of cast-iron guns of 25-inch bore, which will throw a shot of a ton weight. Their armour consists of a narrow belt of the most massive character, and of a single turret. The latter is placed amidships: it is 24 feet in internal diameter, and 9½ feet high. To its top is attached a bell-mouth 3½ feet high, to throw off any water that may dash against it. Strong bars of iron cover the top, and over them are spread perforated iron plates 1 inch in thickness. The pilot-house is a cylindrical iron chamber, 8 feet in diameter, 7 feet in height, and 13 inches thick, set on top of the central pillar or spindle, round which the turret revolves. In its interior the steering wheel is placed, and there the captain can instruct the steersman, while immediately beneath him are the gunners, who can also receive his instructions.

In the British turret ship there is an upper or weather deck, through a circular hole in which the turret rises, surrounded by a ring-shaped bevelled *glacis-plate* (as in the Plate 'Turret Ship' prefixed to the present volume). Round that deck are hinged bulwarks, which can be turned down in action. In the Monitor form the deck on which the turret stands is itself the weather-deck. In both cases the exposed decks are plated with iron or steel from half an inch to 2 inches thick, under or over the timber planking. The armour of the sides comprises in both cases a belt of suitable depth between wind and water, extending up to the level of the deck that carries the turret; in the British form that belt is flush with the side; in the American form it overhangs. In the British form the armour-plating alongside the turret, or turrets, is carried up to the level of the upper deck, and also round afore

and abaft the turrets in the form of a pair of curved bulkheads. The armour of the turrets does not extend below the level of the weather-deck (see Plate).

Owing to the fewness and small size of the openings in armour-plated ships, their proper *ventilation* requires special appliances, such as fans and air-ducts. In Monitors, where the weather-deck is almost at the water-line, the inlets for fresh air and outlets for foul air are vertical trunks, rising to such a height as to be safe from the entrance of water at their upper ends. In ships with hollow iron masts, those masts may be used as chimneys to carry off foul air.

In the Plate prefixed to this volume we give a design for a sea-going turret vessel. The sides of the ship and walls encasing the turret-battery are represented in defensive powers by a maximum weight per square foot of side of 467 lbs.; minimum 433 lbs. The main deck is armour-plated with 1½ inch plates, and the openings in the deck are capable of being closed against shot or shell. The boats are stowed on a hurricane deck over the turrets, and the anchor fittings are specially arranged to suit the system. The bulwarks, shown broken off in elevation (fig. 1), are made to turn all round the vessel. The guns of the turrets (as shown by the *arcs of training* marked on the plan) are capable of a concentrated fire of 2400 lbs. from either bow (as at *a*, *a*, *h*, *h*, fig. 2), and a direct fire in a line with the keel ahead, *c*, *c*, and astern, from two 600-pounders. The following are the principal dimensions:—Length, 260 feet; beam, 54 feet; draught, 23 feet; height of deck above water, 10 feet 6 inches; height of port-sill, 12 feet 6 inches above water; horse-power, 800 nominal; tonnage, old measurement, 3530.

As an example of an actual turret ship, which has stood the test of battle, may be taken the *Hrolf Krake*, which took part in the engagement between the Austro-Prussian and Danish fleets, May 9, 1864. She was built for the Danish government, from the designs of Captain Coles, by Messrs R. Napier & Sons, and is fitted with two turrets, each of which are capable of carrying two 120-pounder guns, thus giving a broadside of four 120-pounders. Her principal dimensions are—length, 183 feet 6 inches; beam, 38 feet 2 inches; draught of water, 10 feet 4 inches; armour-plating, 4½ inches thick; height of deck above water in midships, 4 feet 9 inches; height of port-sill above water, 6 feet 4 inches; horse-power, 235 nominal; speed, 10 knots; tonnage, 1246, old measurement.

We may also add a description of the turret ship *Huascar*, built for the Peruvian government by Messrs. Laird Brothers, of Birkenhead. Her armament consists of one turret, forward, carrying two 300-pounders; broadside guns, two 40-pounders, rifled. Her dimensions are—length, 200 feet; beam, 35 feet; draught of water 13 feet 3 inches; nominal horse-power, 300; speed, 11 knots; tonnage, 1166, old measurement.

In England Captain Coles' system has, after much discussion and many obstacles, been adopted. The first ship to which it was applied, the *Royal Sovereign*, was an old three-decker, and ill adapted for such heavy work. Nevertheless, competent judges have pronounced it the strongest vessel in the British navy, and its seaworthiness has been successfully demonstrated during a cruise in the channel. At the naval review of 1867, the *Royal Sovereign* attracted great attention, and was the object of much inquiry on the part of the sultan. The turret has been subjected to heavy firing at a short distance, but its revolving powers were not injured, nor its iron armour seriously damaged: and it is now generally admitted that for coast or harbour defence the turret system has a great advantage over the broadside battery; that it permits the employment of far heavier ordnance, secures greater steadiness of firing, provides for the comparative safety of the gunners, and offers a much smaller mark to the enemy. Impressed by these considerations, the Admiralty have recently ordered the construction of four iron turret ships of immense power, with a burthen of 4000 tons each. [CUPOLA SHIP.]

TURRIFF. [ABERDEENSHIRE.]

TURRITELLA, a genus of pectinibranchiate gastropodous Molluscs, placed by Cuvier among the *Sabots*. [TURBINIDÆ.] It is now regarded as the type of the family *Turritellidæ*, which also includes the genera *Aclis*, *Cæcum*, *Vermetus*, *Siliquaria*, and *Scalaria*.

Shell, turriculated, pointed, rather delicate, generally striated in the longitudinal direction of the whorls of the spire, which are numerous; aperture rounded, entire, with the edges of the lip disunited above; the outer or right lip fragile.

Operculum, horny, its elements concentric.

Example, *Turritella rosea*, Quoy and Gaim. Shell elongate-conical, smooth, transversely very slightly furrowed, rosy, the whorls convex; the spire acute; the aperture subquadrate. Locality, New Zealand.

TURTLE. [TORTOISES.]

TURTLE-DOVE (*Turtur communis*, *Columba turtur*, Linn.) This elegant species of Dove is the *Tourterelle* of the French; *Tortora commune* of the Italians; and *Turtel Taube* of the Germans.

The Turtle-dove is extensively spread over Europe and Asia, appearing to be everywhere migratory; Africa probably affording it a winter retreat. 'These birds', says Mr. Yarrell, 'arrive in England about the end of

Turtle Doves.

April or the beginning of May, and are rather more numerous in the south-eastern, southern, and midland counties than in those which are farther north. Their appearance is observed and hailed each returning spring, as denoting the season of buds and flowers; and as emblems of serenity and peace their mournfully plaintive notes give pleasure. They frequent woods, fir plantations, and high thick hedges dividing arable land. They make a thin, almost transparent, platform nest, 8 or 10 feet above the ground, in the forked branch of an oak, on a fir-tree, or near the top of a thick and tall bush. Upon this nest the female deposits two eggs about the middle of June, according to the observations of Mr. Jenyns. The eggs are white, rather pointed at one end, one inch two lines and a half

long, by ten lines in width. The parent birds sit by turns, the male occasionally also feeding his mate during incubation, and both afterwards mutually labouring for the support of the young. In this country they are considered as producing but one brood in the season, but in the south of France these birds are known to have a second pair of young. Their food is grain, particularly wheat, and they are constant visitors to the wheat-field while the corn is growing, and to pea-fields; they also feed on rape and other small seeds. In the autumn they fly in small parties of ten or twelve birds, and leave this country about the end of August, and sometimes as late as the end of September, particularly in those seasons when our harvest is backward. I have several times killed both adult birds and the young of the year when out partridge-shooting in Hertfordshire; but I have observed that these birds are more numerous in the thickly-wooded parts of the middle of the county of Kent than elsewhere.'

TUSCAN ARCHITECTURE. [CIVIL ARCHITECTURE.]

TUSCANS. [ETRURIA.]

TUSCANY (*Toscana*), a division of western central Italy, formerly a grand duchy, is situated S. of the main ridge of the Apennines, and between it and the Mediterranean Sea. It lies between 42° 20′ and 44° 10′ N. lat., and 10° 15′ and 12° 20′ E. long., and is bounded W. by the sea and Modena, N. by Modena, Bologna, and Romagna; E. by Urbino and Perugia; and S. by Viterbo, and partly by the sea. Its area is 8517 square miles, and it has a population of 1,826,830, including the inhabitants of the island of Elba, which is about 5 miles from the mainland. The coast has a length of about 150 miles, and in the N. consists of a long and nearly continuous sweep, terminating in one of its most conspicuous promontories, called Piombino. The S. part, continued from Piombino to its termination in the still more conspicuous promontory formed by Monte Argentaro, is broken into a number of small bays, of which the largest are those of Piombino, Grossetto, Orbitello, and Porto-Ercole. The shore, though sometimes bold, is generally low, and lined by extensive swamps or Maremma. A part of the valley of the upper Tiber belongs to Tuscany; and also a mountainous tract on the northern slope of the Apennines, containing the sources and upper course of a number of streams which flow towards the Adriatic. With this last exception, the waters flow southwards to the Mediterranean. The principal rivers are, beginning from the north—the Serchio, which flows through Lucca; the ARNO, which, with its numerous affluents, including the Chiana, drains more than one-third of Tuscany; the Cecina, which drains the valley of the same name; the Ombrone, the principal river of Siena; the Albegna, which flows through the southern part of the Maremma, and enters the sea N. of Monte Argentaro; and the Fiori, which drains the most southern part of Tuscany, and then enters the Papal territory.

The surface of Tuscany presents four different regions:—1. The highlands of the Apennines. 2. The hilly tract, which forms the greater part of the province of Siena, between the valley of the Chiana on one side and that of the Arno on the other, and which slopes on the south-west towards the lowlands of the Maremma. The Ombrone forms the principal drainage of this extensive plateau, which is intersected by rather high ridges, some of which are ramifications of the great Apennine chain, whilst others, like Monte Amiata and the mountain of Radicofani, are of volcanic formation. 3. The great valley of the Arno, with the lateral valleys of the Chiana, Elsa, Era, and other affluents. This constitutes the finest, most productive, and most densely inhabited part of Tuscany. 4. The maritime plains, or Maremma [MAREMMA]: a more detailed description of the surface of the country is given under ARNO; FLORENCE, PROVINCE OF; GARFAGNANA; SIENA, PROVINCE OF. The climate of Tuscany is on the whole one of the best in Italy. So far as the principal chain of the Apennines extends, the cold in winter is often severe, and in the low flats along the shore and near it a worse evil is felt, where in summer the air becomes charged with the pestilential vapours of the Maremma; but with these exceptions, there are few if any countries which can boast of a milder temperature, and a more salubrious atmosphere. In January the thermometer marks 37°, and in August 90° Fahrenheit. Cases of longevity are of frequent occurrence, and the annual mortality, never so high as 1 in 36, often does not exceed 1 in 40 of the population.

About one-sixth of Tuscany is planted with vines and olive trees; another sixth is cultivated as arable land; nearly two-sixths are either forests or plantations of chestnut trees, which latter afford food to the population of the mountains; and nearly all the remainder pasture land. The most common way of letting land is on the 'metayer' system, by which the farmer finds half the seed and implements, and gives the owner half the produce in kind. The landlord stocks the farm, and a valuation is given to the farmer, who has to make all good on leaving.

The principal articles of produce are—wine, oil, and silk, but maize, wheat, rye, and barley are also grown to a very considerable extent. The other articles of native produce exported are—fruit of various sorts, lamb and kid skins, potash, timber, cork, juniper berries, marble and alabaster, iron from Elba, borax, sulphur, alum, and anchovies, which are fished off the coast. Nearly the whole trade of Tuscany with other countries is carried on through the port of LEGHORN. Horned cattle are not very numerous; the sheep are estimated to amount to about 700,000: most of the flocks migrate in the autumn from the highlands, to pass the winter in the Maremma. The wool is of an inferior description, and only suitable for the commonest purposes. Goats are kept in large numbers, and yield a milk which is highly prized for making cheese. The common horse is of an inferior breed. The asses are strong and fine. Pigs are reared in great numbers in the woods of the Maremma, where they feed upon acorns. Game of most kinds is abundant.

The mineral products are—iron, from the island of Elba, the ore of which is smelted and cast on the mainland, at Cecina, Valpiana, and Follonica; copper, lead, marble, sulphur, rock-salt, alabaster, and alum. Sea-salt is made chiefly in Elba.

The manufactures of Tuscany consist of woollen, hempen, and linen cloths; woollen caps for the Levant; silk stuffs, paper, glass, leather, wax; coral, which is gathered on the coast of Barbary and worked at Leghorn; iron-ware, alabaster vases, and other ornaments, wrought at Volterra; china and delft ware. The straw-plat manufacture has declined greatly of late years. In 1866 the total exports from Tuscany to the United Kingdom were valued at 550,140*l.* and consisted chiefly of olive oil, marble, copper ore, anchovies, and boracic acid. The imports into it from the United Kingdom, in the same year, were valued at 1,262,675*l.*, the principal articles being cotton, linen, woollen, and

iron manufactures. For administrative purposes Tuscany is divided into the following districts, each forming a province of the kingdom of Italy:—Arezzo, population 223,826; Florence, 705,127; Grossetto, 86,972; Livorno or Leghorn, 113,520; Lucca, 264,478; Pisa, 237,664; and Siena, 195,243. The chief town is FLORENCE. The important towns of AREZZO, LEGHORN, LUCCA, PISA, PISTOJA, SIENA, and the island of ELBA are described in separate articles.

The ancient history of Tuscany is included in that of Etruria, of which it formed the northern part. It was afterwards comprehended in the great Lombard kingdom, and when the latter fell before the arms of Charlemagne, was created into a marquisate, to which Boniface was appointed (818). His descendant, the illustrious Countess Matilda, so well known for her devotion to the church, bequeathed the southern districts of her dominions to the pope, and they were accordingly annexed to the papal states. In the northern part (then called Tuscia) gradually grew into prosperity various flourishing cities, as FLORENCE, PISA, LUCCA, and SIENA. Florence became an independent republic about 1198, and in due time incorporated the whole of Tuscany in her domains. Pisa maintained a long and vigorous resistance, but eventually submitted to her wealthier and more powerful neighbour in 1406.

The Florentine republic continued independent, under the government of the Medici family, from 1420, when that extraordinary family first rose into importance, until 1530, when it signed the death-warrant of its liberties by appointing Alexander de' Medici perpetual governor. The power and influence thus obtained were consolidated by the genius of Lorenzo de' Medici, whose successor, Cosmo, converted the government into an hereditary monarchy as the Grand Duchy of Tuscany, 1569. [MEDICI, FAMILY OF.]

The grand-ducal crown remained in the Medicis family until its extinction in 1737–38, when, by the treaty of Vienna, it was bestowed upon Francis, duke of Lorraine (1737–65), who had married Maria Theresa, afterwards empress of Germany, in return for his cession of his hereditary states to France. He was succeeded by Leopold I. (1765–90).

When Napoleon conquered Italy in 1799, the grand duke was forced to fly, and his dominions were conferred by the conqueror upon Louis, duke of Parma, with the new title of King of Etruria, who reigned but two years, and was succeeded by his son, Louis II., in 1803. This phantom sovereignty was soon swept away by its creator, and Tuscany annexed in 1807 to the French empire. In the following year the emperor appointed his sister, Eliza Bonaparte, grand duchess, and she maintained a brilliant court at Florence, until the fall of Napoleon remodelled the map of Europe, and Ferdinand III. (1790–1824), the legitimate prince, was restored to his throne (1814).

It is an old saying that the Bourbons learn nothing by misfortune, and under the rule of its stolid dukes Tuscany made but little progress in the development of her resources. They ruled tyrannically, and showed themselves ever inimical to freedom of speech and the cultivation of those arts which freemen love. They were accordingly regarded with a deep hatred and loathing by their subjects, and the more so because they were in effect Austrian satraps, who obeyed the orders issued from Vienna, and helped to maintain Austrian influence in Italy.

In the year of revolutions, 1848, Leopold II. (1824–59) endeavoured to propitiate his subjects, and arrest the progress of the revolutionary spirit, by granting them a free constitution; but his new-born liberality was necessarily regarded with suspicion. An insurrection broke out at Florence on the 11th of February, 1849, and the duke was compelled to fly. A republic was proclaimed, but the condition of affairs was not then favourable for the realization of the long-cherished Italian dream of liberty and unity; and in July, 1850, an Austrian army restored Duke Leopold to his throne.

The war between France and Austria in 1859 afforded Italy the opportunity she had so long waited for. The Italians saw in Piedmont a *point d'appui* for their resistance against the Austrian power, and in Victor Emanuel a gallant ruler for a constitutional kingdom. The Tuscan army demanded an alliance with the Sardinians, and proclaimed Victor Emanuel dictator. Duke Leopold retired to Bologna, and in May the Sardinian commissary, Buoncompagni, assumed the provisional government. By abdicating in favour of his son, Ferdinand IV., the grand duke hoped to secure the throne in his family, but the Tuscans were determined upon forming part of a free Italy, and of wholly ridding themselves of the Bourbon tyranny. In September, 1859, the Constituent Assembly voted the annexation of their state to Piedmont, a vote confirmed on the 12th of March by universal suffrage; and on the 26th, Prince Eugene of Savoy-Carignan was appointed governor. A decree of the king of Italy in December, 1864, named Florence the capital of Italy, and such it will remain until the new kingdom is finally consolidated, and the edifice securely crowned, by the removal of the seat of government to its only permanent and legitimate centre, imperial Rome.

TUSCULUM. [FRASCATI.]

TUSSAC GRASS, the common name of the *Dactylis cæspitosa* of the Falkland Isles, remarkable for growing in great tufts, 5 or 6 feet high, with long tapering leaves, frequently 8 feet in length, whose tops bend over in graceful curves. It furnishes excellent fodder for horses and cattle generally, and has been successfully introduced into the Hebrides and Orkneys. It flourishes best in peaty soil, and in localities exposed to the sea breezes. The young shoots are boiled and eaten as asparagus; while the Falkland islanders also relish the inner part of the stem, which is said to resemble the hazel nut in flavour.

TUSSER, THOMAS, was born at Rivenhall, near Witham, in Essex, probably about 1515. He was taught singing at an early age, and became a chorister in the collegiate chapel of Wallingford Castle, whence he was removed by impressment, for the service of the royal chapel. When he had spent ten years at court, probably engaged in his musical capacity, he married, and became a farmer at Katwade, now Cattiwade, in Suffolk, where he wrote 'A Hundreth Good Pointes of Husbandrie,' the first edition of which appeared in 1557. After several other changes of residence, and marrying a second time, he returned to London, whence, about 1574, he went to Trinity College, Cambridge, in order to escape from the plague. He is supposed to have returned to London, where he died about 1580, or between that year and 1585. After passing through several editions, his work appeared in an enlarged form in 1573, and was many times reprinted with various alterations. The life of the author, which forms by no means the least amusing part of the book, appears to have been first printed with the edition of 1573.

TUSSILA'GO, a genus of plants belonging to the natural order *Compositæ*. The species are natives of Europe and America. Two are natives of Great Britain.

T. farfara, common Coltsfoot, is a native of moist, chalky, and clayey situations throughout Europe. Its flowers come up in March and April, and have often disappeared before the leaves ascend from the ground. This plant from the earliest times has had a great reputation for curing coughs. The part used is the leaves, which are very large, and clothed on the under surface with a dense white cottony down. They are mucilaginous, astringent, and slightly bitter, and are used either in infusion or decoction, or dried and smoked like tobacco. The plant is not often used now by the medical practitioner.

T. petasites, common Butter-bur, is very abundant in wet meadows and by river sides. This plant produces the largest leaves of any in Great Britain, sometimes measuring 3 feet broad.

T. fragrans, Fragrant Coltsfoot, blossoms early, and has a sweet scent, and has found very generally a place in gardens. It is a desirable flower where bees are kept.

TUTBURY. [STAFFORDSHIRE.]

TUTENAG, an alloy used in China in the manufacture of the *Gong*. It is white, resembling silver in appearance, and is very sonorous when struck. It consists of copper 40, zinc 25, nickel 32, iron 3. It is susceptible of a fine polish, and does not readily tarnish. At common temperatures, and even at a red heat, it is malleable, but when heated to whiteness it is rendered brittle.

TUTOR. By the Roman law a male under the age of fourteen, and a female under the age of twelve, were called Impúberes. A male who was impubes was incapable of doing any legal act by which he might be injured; his property was under the care of a tutor, who was so called from his office of defending or protecting (*tuendo*) the impubes in the transactions which were necessary for the administration of his property. The office of the tutor was tutéla; and the impubes, who with respect to his tutor was called pupillus, was said to be in tutéla, in tutelage. The tutor's business was to manage the property of his pupillus, and to add to his acts the legal sanction (auctoritas). When the pupillus attained the age of puberty, he had the capacity of contracting marriage, and of doing other legal acts, and was freed from the control of his tutor. But though the law gave full legal capacity to the pupillus on his attaining puberty, it still gave him some further protection until he was twenty-five years of age. [CURATOR.]

A father could appoint by testament a tutor for his male children who were impuberes and in his power; he could also appoint for females who were in his power, even if they had attained puberty. A father could also nominate in some other cases. If a testator appointed no tutor, the tutela was given to the nearest agnáti by the Twelve Tables: such tutors were legitimi. When there was no person appointed tutor, and no legitimus tutor existed, one was appointed for persons at Rome under the provisions of a Lex Atilia, and for persons in the provinces under the provisions of a Lex Julia et Titia.

TUTSAN, the name of a plant indigenous to Great Britain, the *Hypericum androsæmum* of Linnæus. The English name is derived from *toute saine*, French, a term employed on account of its bruised berries having been employed as an application to recent wounds. It is found in damp places throughout Europe, but is not an abundant plant. In Great Britain its distribution is very local. It occurs plentifully in some parts of Norfolk and Hertfordshire, and is not unfrequent in Ireland and the west of Scotland.

TUTTI (Italian), in Music, a direction indicating that from the place to which it is affixed all the instruments are to play together.

TUTTY POWDER, an impure oxide of zinc collected in the chimneys of the smelting furnaces, and occasionally used for medicinal purposes.

TUXFORD. [NOTTINGHAMSHIRE.]

TWEED. [PEEBLESSHIRE.]

TWELFTH DAY, the twelfth day after Christmas, and the festival of the Epiphany, or Manifestation of Christ to the Gentiles. It was formerly one of our great English holidays, and the occasion of several curious popular ceremonies. In commemoration of the supposed visit of the Three Magi, or kings, Melchior, Jaspar, and Balthazar, a play or 'mystery' was wont to be publicly performed, in which all the incidents of the said visit were sensationally dramatized. It was also customary for the sovereign, either in person or through his chamberlain, to deposit on the sacred altar a gift of gold, myrrh, and frankincense. Another mode of commemoration was the election of kings by beans. For this purpose a great cake was made in every household, and a pea and a bean were concealed in it. After it had been baked, it was divided into as many portions as there were members in a family, and each drew his share by lot. Whoever selected the bean was declared king, whoever received the pea became queen, and the two sovereigns afterwards appointed the various officers of their mimic court, and presided over the festivities of the court. Herrick has celebrated the custom:—

'Now, now the mirth comes
With the cake full of plums,
Where *bean's* the king of the sport here;
Besides we must know,
The *pea* also
Must revel as queen in the court here.'

Under the Stuart kings a grand Masque was always performed before the court on Twelfth Day; and we also read 'of the English nobility keeping the occasion otherwise than with cake and characters, by the diversion of blowing up pasteboard castles; letting claret flow like blood, out of a stag made of paste; the castle bombarded from a pasteboard ship, with cannon, in the midst of which the company pelted each other with egg-shells full of rose water; and large pies were made, stuffed with live frogs, which hopped out quickly enough if any person of an inquiring turn of mind lifted the lid.' Twelfth Day is now almost forgotten, the only relic of all its past splendours being the 'Twelfth Cakes,' whose sugared tops and quaint decorations make such a show in our confectioners' windows.

TWELVE TABLES. [ROMAN LAW.]

TWELVEMO, in Printing, a sheet folded into twelve leaves. It is now generally known as *duodecimo* (12MO).

TWENTY-FOURS, in Printing, a sheet of printed paper folded into twenty-four leaves, or forty-eight pages.

TWER, or TVER, a government of Russia, is bounded N. by Novgorod, E. by Yaroslav and Vladimir, S. by Moscow and Smolensk, and W. by Pskov. The area is 25,000 square miles, and the population 1,516,109. This government, especially in the northern part, is an elevated table-land; there are no mountains, for the Wolkonsky forest, which covers the greater part of the circle of Ostuschkow, is but a range of hills; in them, however, the Volga and many large rivers have their source. Besides the Volga the chief rivers are the Dwina, the Wäsuga, the Twerza, the Sestra, the Soscha, and the Mologa. The canal of Wyschnei-Wolotschok unites the Volga and the Neva, thus effecting a com-

munication between the Baltic and the Caspian. The most considerable lake is the Seeliger, which is 24 miles long and 4 wide, but there are many smaller ones in the north-west of the province. The climate is healthy but somewhat severe, and the weather is very variable. The rivers generally freeze by the beginning of December, and thaw towards the end of March. Cattle breeding and agriculture are the general occupations of the inhabitants: the soil is poor and marshy, and the produce is scarcely more than enough for the home consumption. Rye, barley, oats, and a little wheat are produced. Much flax and hemp are grown. Garden vegetables are plentiful. Fruit is scarce. Timber is very fine and abundant. There are many bears, wolves, foxes, badgers, and martens. Fish are very plentiful, and fishing affords employment to a large number of the inhabitants, many of whom are also employed in saw-mills, brick-kilns, boatbuilding, and in land and water carriage. The excellent inland navigation affords the greatest facilities for exporting the produce of the government, and favours the transit trade between the southern provinces and the Baltic.

Tver, the capital of the government, situated in 56° 52′ N. lat., 35° 48′ E. long., stands on the right bank of the Volga, over which there is a bridge, and which is here joined by the Twerza and the Tmaka. The town is the only one of importance on the railway from St. Petersburg to Moscow; and as the Volga is navigable for steamers up to it, it is a place of great commercial importance. Tver is surrounded with palisades, which are closed by barriers, and consists of three parts: the fortress lying between the Volga and the Tmaka, which is encircled with a rampart; the city, which is divided by the rivers into four parts, united by three bridges; and a suburb. The town is regularly and well built, and has a cathedral, thirty churches, two convents, bazaar, palace, theatre, foundling asylum, hospital, gymnasium, and an ecclesiastical seminary. Tver has 27,000 inhabitants, who manufacture cotton, linen, leather, hardware, especially nails, and candles, and carry on an extensive transit trade.

The other principal town in the government is *Torzhok*, *Torshok*, or *Torjok*, 36 miles W.N.W. of Tver, on the Twerza, which is one of the most ancient in Russia, having been founded in the eleventh century. Lat. 57° 2′ N., long. 35° 3′ E. Population, 16,240. Since its partial destruction by fire, in 1767, it has been rebuilt with much regularity. The public edifices comprise a cathedral and many other churches, two convents, a government-house, normal school, and orphan asylum. It is famous for a holy spring, visited by pilgrims from all directions. Its position on a navigable river, and on the road from Moscow to St. Petersburg, renders it of considerable commercial importance; it has three large annual fairs, and extensive manufactures of coloured Russia leather, including shoes, gloves, and various articles embroidered with gold and silver, which are exported in large quantities. There is also a considerable trade in malt, corn, and flour.

(Hassel, *Handbuch*; Stein, *Lexicon*; Schnitaler, *La Russie, la Pologne, et la Finlande.*)

TWICKENHAM. [MIDDLESEX.]

TWILIGHT (German, *Zwielicht*), the name given to the light which remains after the sun has set, or which is seen immediately before he rises. The twilight, which is an effect of the light reflected from the higher strata of the atmosphere, begins or ends at the time when the sun is at a certain depression below the horizon, the depression depending upon the state of the atmosphere for the time being. In the fogs of winter darkness comes on almost immediately after sunset, while on a clear summer evening the broad light of day will continue for more than an hour, in our latitude. In tropical climates the sun descends and ascends almost perpendicularly to the horizon, and therefore his apparent motion is so rapid that the interval between light and darkness is very short; whereas, in higher latitudes, he approaches more obliquely to the horizon, and moves more obliquely to it after he has set. This causes his vertical descent and ascent to be more slowly made, and thus the duration of twilight is increased: the increase is apparently greater in consequence of the pupil of the eye having more time to accommodate itself to the diminished quantity of light.

TWISS, HORACE, a prolific writer, and a distinguished member of the House of Commons. He wrote the life of Lord Eldon, and held several political or legal appointments; among others, that of vice-chancellor in 1844. He died in 1849.

TWO-LINE LETTERS, in Printing, capitals which are equal to two bodies of any specific size of type. They begin with two-line pearl, equal in depth to long primer, and increase regularly up to a two-line great primer, equal in depth to two lines of great primer, or four of bourgeois.

TYCHO BRAHE. [BRAHE.]

TYCOON, the name of the hereditary prime minister of Japan, who performs all the duties of sovereignty, and holds much the same relation to the Mikado, or sacred emperor, as did the mayor of the palace (*Maire du Palais*) to the Merovingian kings of France. His residence is at Yeddo, the capital. His correct appellation is *Thooyoun*.

TYLOPHORA, a genus of plants of the natural family of *Asclepiadaceæ*. The species form twining herbs or under-shrubs. They are found in India, the Malayan Peninsula, Java, and New South Wales, and are not of any known use, with the exception of *T. asthmatica*, which is frequently employed in Hindustan as a substitute for ipecacuanha.

TYMPANUM. [EAR.]

TYNDALE or TINDAL, WILLIAM, the Protestant martyr and translator of the Scriptures, was born at Hunts Court, North Nibley, in Gloucestershire, in 1477, or, according to some authorities, in 1484. He entered Oxford University at an early age, and after taking his degree, removed to Cambridge to complete his education. In March, 1502, he was ordained, and soon afterwards became a friar in the monastery of Greenwich. About this time he would seem to have begun those biblical studies which influenced so largely his after-career; and probably he had already become acquainted with the leading doctrines of Luther, of which he was soon to be a powerful defender. In 1522 he entered the household of Sir John Welsh, a Gloucestershire knight, as tutor, where he translated the 'Enchiridion Militis' of Erasmus, and dedicated it to his patron. He frequently preached in the surrounding villages, openly avowing his sympathy with the Lutherans, and entering into verbal combats with the Romish priests that caused him to fall under suspicion of 'heresy.' Cherishing a keen desire that every English ploughboy should be able to read the word of God in his native tongue, he betook himself to London for the purpose of translating the New Testament. Disappointed in his hope of securing the protection of Tunstall, the learned bishop of London, he found an asylum in the house of wealthy Alderman Humphrey Monmouth, whose heart

and soul were in the great good work. Here he was hospitably entertained for six months, and when, in 1523, he went abroad, Monmouth generously settled upon him an annual allowance of 10*l.*—a greater sum of money in those days than it is in ours.

In Germany Tyndale had an interview with Luther; and at Worms he published his 'New Testament,' about 1525 or 1526. Copies were poured out by hundreds from the foreign presses, and the flood of light soon flowed into England, spreading from north to south, and east to west. Tunstall immediately prohibited their sale, threatening sellers and buyers alike with the terrors of excommunication, and purchasing all he could lay hands upon in order to consign them to the flames. The money thus disbursed, however, supplied Tyndale with the funds he stood in need of, and enabled him to print additional supplies. His brother and two friends were sentenced, for distributing these, to pay a fine of 18,840*l.* 0s. 10d., and condemned to ride on horseback, facing the horse's tail, as far as Cheapside, where the auto-da-fé was regularly celebrated. Sir Thomas More was next enlisted against the dangerous heretic, and attacked him with exceeding virulence, strangely in discordance with his ordinarily sweet and generous disposition. Such changes are wrought in a man's nature by the bigotry of religious zeal.

In 1528 Tyndale published his 'Obedience of a Christian Man,' which was followed, in 1530, by his translation of the 'Five Books of Moses.' In his version of Deuteronomy he was assisted by Miles Coverdale. In the same year he gave to the world a bitter onslaught on the vices of the Romish prelacy in his 'Practice of Prelates,' which appears to have roused the especial wrath of Henry VIII. Tyndale's enemies now endeavoured by various devices to entrap him into visiting England; but well assured that he would immediately be arrested and burnt as a heretic, he remained quiet at Antwerp, prosecuting his studies, acting as chaplain to the company of English merchants, and engaged in a careful revision of his 'New Testament,' 'which,' he says in the preface, 'I have looked over again with all diligence, and compared with the Greek, and have weded out of it many fautes.' From the reprint made by Bagster in 1836 we extract a passage, which the reader may compare with an extract from Wycliffe's version, which is given in our life of that great reformer. [WYCLIFFE.]

'Jesus answered and sayde: A certayne man descended from Jerusalem into Jericho. And fell into the bondes of theves, whych robbed hym off his rayment and wonded hym, and departed, levynge hym halfe deed. And it chaunsed that there cam a certayne preste that same way, and saw him and passed by. And lykewyse a levite when he was come neye to the place went and loked on hym, and passed by. Then a certayne Samaritayne as he iorneyed cam neye unto hym, and behelde hym, and had compassion on hym, and cam to hym and bounde uppe hys wondes, and poured in wyne and oyle, and layed hym on his beaste and brought hym to a common hostry, and drest hym. And on the morowe when he departed he toke out two pence and gave them to the host and said unto him, Take care of him, and whatsoever thou spendest above this when I come agayne I will recompence the. Which now of these thre thinkest thou was neighboure unto him that fell into the theves bondes? And he answered, He that shewed mercy on hym. Then sayd Jesus unto hym, Goo and do thou lykewyse.'

At length, through the treachery of a spy named Henry Phillips, Tyndale was apprehended, conveyed to Vilvoorde, and flung into prison. Two years later he was tried by judges already determined on his conviction, and sentenced to death as a heretic. On Friday, October 6, 1536, he was chained to the stake, strangled, and burned to ashes, his last words being, 'Lord, open the king of England's eyes!' He did not give his life in vain, for in the following year the Bible was published by royal command, and placed in every church, for the benefit of the common people. And the present authorized version is closely based on the translation executed by this learned, pious, industrious, and self-denying man.

Reprints of his translation of the New Testament have been printed, and his other works have been collated, together with those of Frith, by Thomas Russell, A.M., 3 vols. 8vo, London, 1831.

TYNE. [NORTHUMBERLAND.]

TYNEMOUTH. [NORTHUMBERLAND.]

TYPE and TYPE-FOUNDING. Type (Gr. *τύπος*, 'an impression or stamp'), in PRINTING, is the name given to the letters, stamps, and signs of all kinds with which books, newspapers, and periodicals are printed. Their invention is generally ascribed to Koster, the original discoverer of the art of printing. He at first used blocks of wood, on which he engraved, or carved, the words required, but afterwards introduced separate wooden letters. Gutemberg, about 1444, first endeavoured to form types of metal. His method was to cast the shank or bodies of a suitable size, and then to engrave the letters upon them. Schœffer, in 1452, completed the invention of metallic types by casting them with faces. He cut matrices for the whole alphabet; and from the types produced issued the *Durandi Rationale*, which was finished in 1459.

As the art of printing spread over Europe, the early printers usually manufactured their own types, the various branches of the art—type-founding, printing, and binding—being classed and carried on under the general term of 'printing.' Type-founding did not become a distinct manufacture in Britain until the seventeenth century. In July, 1637, a Star Chamber decree on printing stated, among other regulations, 'That there shall be four founders of letters for printing, and no more;' and vested the power of supplying the places of these four with the archbishop of Canterbury, the bishop of London, and other six high commissioners. These restrictions continued in force till 1690, when the art was erected into a free and independent trade. Until the advent of William Caslon, however, the British were unable to compete with the productions of the German founders, who imported largely into Britain; but the beauty and excellence of his workmanship rapidly superseded the foreign type, and his founts were in turn exported to the Continent. The reputation thus given to British type-founding has since been zealously upheld, until the art has well-nigh attained perfection, both as regards beauty of execution and rapidity of production.

Down to the year 1465 the type used in printing was known as **Black Letter**, when the form of type now in general use, termed 'Roman,' was introduced in a volume executed at Rome. The Roman 'face' consists simply of circles, arcs of circles, and straight lines; and to their graceful combination is due that elegance and regularity which characterizes the best modern efforts of typography. *Italic* type was first produced at Venice, in 1496, by Aldus Manutius.

As now manufactured, a type itself is a thin metallic bar, of varying width, having, in Britain, an uniform

height of $\frac{23}{32}$ inch—slightly differing from the Continental standard. It is made perfectly true and square on all sides, and is slightly grooved at its base, so that it may stand perfectly even and steady.

The first and most important section of the manufacture is the formation of the *punch*, which is a well-tempered piece of steel, bearing on its face a single letter, formed with the greatest possible accuracy by filing and cutting. The face of the punch exactly resembles that of the finished type, the letter being reversed and in high relief. The punch-cutter has to exercise great care and judgment in making the letter of precisely the right size, form, and thickness, so that it may range and coincide exactly with all the other letters of the same size or 'fount.' When the punch is completed and hardened, it is struck into a piece of copper, which, when it has received the impression, is called a *matrix*, and forms a mould for the face of the type; and it is upon the delicacy with which the matrix is formed that the superiority of the type depends. Of course each separate letter and mark used in printing must have its own punch and matrix.

The matrix is now transferred to the caster, who fixes it in the 'mould,' a steel instrument made in two halves, and attached, for convenience of holding, to outer coverings of wood. These halves are capable of adjustment to the varying widths of the letters, and are so constructed that they instantly fit together, leaving a shelving orifice at the top, into which the molten metal is poured by a very small ladle from a convenient melting-pot. The mould is now slightly jerked upwards, causing the metal to sink down to the face of the matrix, and, instantly cooling, the mould is opened, and the type thrown out. The types thus produced have each a small 'tag' or shank of metal attached to its body, being that which filled the orifice of the mould. These having been broken off by boys, the types are removed to another table, where a boy rubs or smooths their sides upon a stone. They are next set up in long lines upon a 'stick,' where they are dressed or finished, and after being 'picked' (examined by a magnifying glass to detect imperfect letters) are ready for use.

All the types belonging to a special fount are distinguished by one or more grooves or *nicks* across the lower side of the body; a simple contrivance which enables the compositor to set them up and place them upright in one direction without looking at the face of the letter. These nicks are formed by inserting wires in the mould. The process of hand-casting is executed with great celerity, a good caster producing about 4000 types per day.

Type-founding has latterly undergone some important changes and improvements, the principal being the introduction of machine casting, and the application of electrotyping in making copies of new styles got up by foreign or rival founders; but the matrices thus produced are not so durable.

Various attempts were made during the early part of the present century to cast type by machinery, the original machine being first devised in America about 1828, since which it has undergone many modifications in the hands of different founders, and its use has become so general that the process of hand-casting may be said to have been superseded. The ordinary improved casting machine consists, first, of a small melting pot containing the molten metal, which is placed over a small furnace having an outer case or frame of cast iron. In the interior of the pot is arranged a forcing-pump and valve for admitting the metal under the piston, and for preventing the return of the metal into the pot when the piston is depressed, thus securing the full force exerted upon the piston being transmitted from it to the molten metal below, and forcing it through a narrow channel to the outside of the pot. Here a nipple is inserted with a small hole drilled through it to communicate with the narrow channel. The mouth of the type mould is brought up against this nipple at the moment when the piston descends and forces the metal upwards, and thus receives the due supply of metal requisite to form the type. The second part of the machine is that which carries the mould, and to which it is firmly secured. The mould itself is similar to the old hand mould, though modified to suit the machine, and much stronger. It is also made in halves, the one half being bolted to an arm which is made to oscillate (by means of cams and levers), and carry the mould to and from the nipple above the pot; the other half of the mould is bolted to another arm, so attached to the first arm that the two halves of the mould may be made to open and shut upon each other like the lid of a box, and thus both sides of the mould oscillate together to and from the nipple in the pot from which the metal is received.

The furnace, with the pot and machine carrying the mould, is raised upon cast-iron framing to a height convenient for a man to stand and watch the working of the machinery, which may be thus briefly described:—The piston being raised in the chamber of the pump, and the chamber being supplied with metal through the valve, the mould is brought against the nipple; the valve closes, to prevent the metal being forced back into the pot; the piston descends and forces the metal through the narrow channel into the mould; the mould then recedes from the nipple, and in receding the two halves separate from each other and eject the type; the mould again approaches the nipple, and in approaching the two halves close together, and are ready for another operation. A blast of cold air is directed upon each mould to keep it cool; and in order to prevent the metal from adhering to the nipple, this part of the apparatus is kept lubricated with liquid tallow, which is made to drop on it through a small siphon.

This machine will produce an average of 40,000 types per day, which have afterwards to be finished in a similar manner to those cast by the hand mould.

Messrs. Johnson & Atkinson, London, have invented a machine which is perhaps the most complete yet devised, producing *finished* type at the rate of 30,000 per day. In this machine a double line of grooves are placed side by side, to one of which a travelling apparatus is attached, and upon this the types are deposited as they are cast. As the groove fills it is impelled forward, and in its progress the shanks are broken off. At the end the types are reversed by mechanism into the return groove, in which they are rubbed, dressed, the bottoms planed, and the nicks cut. On reaching the exit end of the groove they are received into a stick, whence they are removed as fast as it is filled, and the type is then ready for packing.

The composition of type-metal varies greatly. Its chief components are lead, regulus of antimony, and tin. The antimony gives hardness and sharpness of edge to the compound, while the tin communicates toughness and tenacity, and removes the brittleness which the antimony would otherwise produce. The actual proportions of the metals are regulated by the size of the type, a greater quantity of antimony being employed for small than for large types.

The principal regular bodies to which types for book-

work are cast in Britain, are Nos. 1 to 14 of the following list, the others being seldom used:—

1. Brilliant.
2. Diamond.
3. Pearl.
4. Ruby.
5. Nonpareil.
6. Emerald.
7. Minion.
8. Brevier.
9. Bourgeois.
10. Long Primer.
11. Small Pica.
12. Pica.
13. English.
14. Great Primer.
15. Paragon.
16. Double Small Pica.
17. Double Pica.
18. Double English.
19. Double Great Primer.
20. Double Paragon.
21. Canon.

Canon is the largest British size with a specific name: above it Pica becomes the standard of measurement, all large types being proportioned to a given number of picas in depth, such as 4-line pica, 8-line pica, &c., up to the largest sizes used in posting-bills, which are usually carved on wood. Pica is also the general standard in preparing the diversified materials used in connection with printing, such as leads, brass rule, furniture, &c., which always bear a certain proportion to each other.

The above sizes, both as applied to regular, and especially to ornamental faces, have undergone every change in form which taste or fancy could suggest, each variety bearing a distinctive name to assist its recognition. In addition to the regular bodies, there are sizes known technically as 'bastard' founts, that is, with the face of one fount cast upon the body of another, such as a *Brevier* face cast upon a *Bourgeois* body, or a *Pica* body cast with a *Small Pica* face.

Subjoined we offer a specimen of book-types from Great Primer to Brilliant, showing the proportion which one size of type bears to another in *width*. It must be observed, however, that almost all founders have peculiar standards of their own, so that founts from different makers do not always bear the same proportion in *depth*. The limitation of each line is marked by an inverted full point:—

There are fundamental

There are fundamental· tru

There are fundamental· truths tha

There are fundamental· truths that lie a

There are fundamental· truths that lie at t

There are fundamental· truths that lie at the

There are fundamental· truths that lie at the bot

There are fundamental· truths that lie at the bottom

There are fundamental· truths that lie at the bottom,

There are fundamental· truths that lie at the bottom, the b

There are fundamental· truths that lie at the bottom, the bas

There are fundamental· truths that lie at the bottom, the basis upon w

There are fundamental· truths that lie at the bottom, the basis upon which a great ma

There are fundamental· truths that lie at the bottom, the basis upon which a great many others

A complete assortment of any book-type is termed a 'fount,' which consists in the English language of about 200 different characters, including capitals, small capitals, small or 'lower case' letters, figures, points, spaces, quadrats, accents, italic letters, &c. Every type-founder has scales showing the proportional quantities of each letter required for a fount, which of course differs in every language. The following table exhibits the number of letters or 'sorts' contained in a perfect fount of 800 lbs. pica, as arranged for ordinary English printing:—

Lower Case.		*Points, &c.*		*Capitals.*		*Small Caps.*	
a	8,500	.	2,000	A	300	A	300
b	1,600	,	4,500	B	400	B	200
c	3,000	:	800	C	500	C	250
d	4,400	;	600	D	500	D	250
e	12,000	-	1,000	E	600	E	300
f	2,500	'	700	F	400	F	200
g	1,700	?	200	G	400	G	200
h	6,400	!	150	H	400	H	200
i	8,000	£	100	I	800	I	400
j	400	(	300	J	300	J	150
k	800	)	150	K	300	K	150
l	4,000	*	100	L	500	L	250
m	3,000	†	100	M	400	M	200
n	8,000	‡	100	N	400	N	200
o	8,000	§	100	O	400	O	200
p	1,700	‖	100	P	400	P	200
q	500	¶	60	Q	180	Q	90
r	6,200			R	400	R	200
s	8,000			S	500	S	250
t	9,000	*Figures.*		T	650	T	325
u	3,400	1	1,300	U	300	U	150
v	1,200	2	1,200	V	300	V	150
w	2,000	3	1,100	W	400	W	200
x	400	4	1,000	X	180	X	90
y	2,000	5	1,000	Y	300	Y	150
z	200	6	1,000	Z	80	Z	40
&	200	7	1,000	Æ	40	Æ	20
fi	500	8	1,000	Œ	30	Œ	15
ff	400	9	1,000				
fl	200	0	1,300				
ffi	150						
ffl	100	*Accents.*					
æ	100	é	200				
œ	60	à	200				
Metal Rules.		â	200				
—	150	ê	200				
——	90	All others					
———	60	100 each.					

Spaces.	
Thick (3 to em),	18,000
Middle (4 to em),	12,000
Thin (5 to em),	8,000
Hair,	3,000
Em Quads,	2,500
En Quads,	5,000
Large Quadrats (2, 3, and 4 ems) about 80 lbs.	

Italic.—One-tenth of Roman.

It will be readily seen from the above, that the letter 'e' is much more frequently used than any other, the quantity of the other letters being singularly diversified.

The manufacture of type in Britain is chiefly confined to London, Edinburgh, and Sheffield, the principal foundries bearing a well-merited and increasing reputation. North America is mainly supplied from New York, Philadelphia, and Boston, where the art is rapidly improving. On the Continent, Germany still ranks first in the production of type. [PRINTING.]

TYPHA'CEÆ, a natural order of plants, belonging to Lindley's spadicose group of Monocotyledons. The order includes two genera, *Typha* and *Sparganium*. They are herbaceous plants, growing in marshes and ditches. The genus *Typha* is known by the male and female flowers being both seated on the same spike, the male flowers being uppermost. There are three species of this genus, inhabitants of the temperate parts of the globe, and all are found in Great Britain. *T. latifolia*, Great Cat's-tail or Reed-mace, is a very handsome aquatic, and grows abundantly in damp marshy places. The leaves are 3 feet in length and an inch in width. When the densely-crowded spike is brushed and a lighted candle applied near it, a sudden flash is produced. This arises from the firing of the pollen that is diffused in the air. *T. angustifolia*, Lesser Cat's-tail or Reed-mace, is less frequent than the last species, but is not uncommon in the neighbourhood of London.

T. minor, Dwarf Cat's-tail or Reed-mace, is found in the south of Germany and Switzerland. Kock calls it *T. minima*.

TYPHO'NIUM, a genus of plants of the natural family of *Aroideæ*, including several species of *Arum* of Linnæus, Roxburgh, and other botanists. The species are all stemless herbs, indigenous to India. Of these *T. orixense* is described by Dr. Roxburgh by the name of *Arum orixense*, and as common in the shady mango groves near Samulkota.

TYPHOON (Gr. τυφῶν, 'a whirlwind') a name frequently applied to a tropical storm: it is also given to the hot winds which occasionally blow with great violence in Africa, Syria, Arabia, and Persia; and which are felt, though rarely and with much-diminished force, in the southern parts of Italy and Spain. The Sirocco of Egypt and the coasts of the Mediterranean, the Simoom of Arabia, and the Harmattan of the coast of Guinea, are understood to be so many designations of the same thing. The fatal effects which have been said to result, both from the masses of moving sand and from the supposed deleterious quality of the winds, are now considered as exaggerations; the inconveniences felt by men and animals during the continuance of the hurricane are chiefly such as arise from the heat and dryness of the air, and from the quantity of sand which is blown into the eyes. [Storms.]

TYPHUS (Gr. τυφος, from τύφω, 'to smoke'), a form of fever, in which low nervous symptoms predominate. The following are its principal features:—It has a slow and insidious origin, lasting from fourteen to twenty-eight days. It is attended during the principal part of its course with symptoms of depressed or exhausted nervous power, with feeble pulse, great muscular weakness, and low delirium. There is a dry, rough, dark tongue, black sordes on the teeth and gums, and general fœtor of the body. It is capable of being propagated by the contagious emanations from the person affected. This is the low nervous or typhoid fever of this country. [Fever; Synochus.]

TYRANNY. [Tyrant.]

TYRANT. The words Tyrant and Tyranny come respectively from the Greek (τύραννος), through the Latin. Tyrant is used by Heródotus and Thucydides, to signify a person who possessed sovereign power and owed it to usurpation, or who derived it from a person who had obtained such power by usurpation, and who maintained it by force. A familiar example of a tyrant is Peisístratos, who usurped the supreme power at Athens, B.C. 560, and was succeeded in it by his eldest son Hippias. A Greek tyrant who obtained sovereign power was a monarch in the proper sense of that term. If he acquired a power which was somewhat less than sovereign, he was not monarch; but in either case he would perhaps be called *tyrannus*; and accordingly the word does not express with accuracy the degree of political power, but it rather expresses the mode of acquisition, or refers to its originally illegal origin. The word, as used by the older Greek writers, did not carry with it any notion of blame: it simply denoted a person possessed of such political power as above mentioned, whether he used it well or ill. Many so-called tyrants were popular, and were men of letters, and patrons of literature and art.

The Roman writers often use *tyrannus* as simply equivalent to king, especially the poets. Cicero couples *dominus* and *tyrannus*, thereby intending to use *tyrannus* in a bad sense, which was perhaps the more common acceptation of the word among the Romans in his time. Trebellius Pollio has written the 'History of the Thirty Tyrants' who sprang up in the Roman empire in the time of Gallienus and Valerian. These so-called tyrants were not more tyrannical, in the modern sense of the term, than many Roman emperors. [Thirty Tyrants.]

The use of the modern words tyrant, tyranny, tyrannical, has been as vague as that of most other political terms. The term 'tyrant' is properly limited to the government of one man who is sovereign, and the popular application of the term expresses disapprobation of his conduct.

TYRE. [Tyrus.]

TYROL, a province of Austria, between 45° 40′ and 47° 41′ N. lat., and 9° 30′ and 12° 30′ E. long., is bounded N. by Bavaria, E. by Carinthia, S.E., S., and S.W. by Italy, and W. by Switzerland. The total area is 12,000 square miles, and the population 850,000. Tyrol is surrounded on nearly every side by elevated mountains, and with the exception of a comparatively small tract, the interior of the country is also covered with high mountain masses, in which a great number of summits rise above the snow-line and are surrounded by extensive glaciers. Level tracts, admitting of cultivation with the plough, are only found on the banks of the rivers, where they sometimes attain a width of a mile, and in a few places more; but they are usually not more than half a mile wide. All these tracts taken together do not cover one-tenth of the surface; two-tenths are meadows and commons, and the remaining seven-tenths are occupied by the higher and lower mountain masses of the Alps.

Physical Aspect—Tyrol may be considered a continuation of Switzerland, and with regard to scenery is only second to that country. The Alps stretch across it from W. to E. in three nearly parallel chains. The loftiest is the Rhetian Alps, which occupy the centre, and divide the province into a north and south portion. In this chain are situated Mount Ortler; the culminating point of the Austrian empire, 12,852 feet; and the Gross-Glockner, 12,560 feet. The second parallel chain, situated in the north, not far from the frontier, forms the Tyrolese or German Alps; and the third chain, to which the name of the Trent Alps is sometimes given, bends round from the Lake of Garda, and continues E. till it becomes linked with the Carnic Alps. All these chains descend very abruptly on the S. side, and form short lateral valleys, but on their N. sides generally slope gradually by parallel terraces, the spaces between which are occupied by long longitudinal valleys. Many of the summits are capped with perpetual snow; and glaciers to the number of eighty, covering in all a space of about 170 square miles, descend into the valleys to the level of about 4000 feet. The most remarkable of these glaciers are the Oesthal, Sulden, Floiten, and Dux. Notwithstanding the height of the chains, the Tyrol has several of the lowest passes in the Alps. The celebrated Brenner Pass is little more than 4000 feet above sea-level, and over it runs the principal route for the conveyance of merchandise between Italy and Germany. The other principal passes are the Malserheide, Timbljoch, Arlberg, Schlossberg, Achen Pass, and the pass near San Pellegrino. The loftiest of all the passes is the Stilfser or Wormserjoch, which is 9000 feet above the sea.

The prevailing rock in these mountains is granite, which usually forms the crest of the chain. On the S. slopes primitive schists and limestones overlie the granite; on the N. slope the rocks are almost entirely calcareous. At lower elevations a greater variety of rocks

appears; and in some localities, of which the Fassathal is the most remarkable example, almost all the great formations of Europe may be seen in miniature. The principal chains mentioned above form three principal valleys—the Innthal, Etschthal or Adige Valley, and Pusterthal. Into these a vast number of minor valleys open, and thus, though no proper plains occur, portions of the surface become flat enough to be placed under regular culture.

Hydrography.—The drainage is divided between the basins of the Rhine, Danube, and Po. The first, forming part of the N.W. boundary, is confined to that locality, and receives only the waters of the Vorarlberg, in part directly, and in part by the Ill and the Bregenz; the latter through the medium of the Lake of Constance. A much larger share of drainage is received by the Danube, whose important tributary the Inn, traversing the celebrated valley of that name, inclosed on the S. by the Rhetian and on the N. by the Tyrolese Alps, receives from both chains, but especially from the former, numerous torrents and streams fed by perpetual snow and glaciers. Another large supply to the Danube proceeds from the S. side of the Rhetian Alps, where the waters of the E. part of the Pusterthal, and of a number of lateral valleys, go to augment the Drave. The Adriatic receives its share chiefly through the Etsch or Adige. Not one of these rivers, except the Inn, is of navigable importance; but their effect on the scenery may be estimated from the fact that they form above 150 large waterfalls.

The largest lakes, the Idrio, Garda, and Constance, being situated on the frontiers, belong less to the Tyrol than to other countries. The others, though very numerous and picturesque, are small.

Climate.—As a great portion of the country, probably one-tenth, is always covered with snow, whilst its more southern valleys are hardly 500 feet above the sea-level, the climate varies greatly in different places. At Innsbruck the mean temperature of the winter is 30°·5, or nearly 8° less than at London; and that of the summer is 64°, or about 2½° more than at London. The mean annual temperature is 49°, or 1° degree less than at London. At Trent the mean annual temperature is 53°, or nearly 3° higher than at London, and the climate of the southern valley, generally, is similar to that of northern Italy. In some elevated parts in the north, however, it is very severe. Owing to the great unevenness of the surface, the air is in continual motion, and a calm day is a rare occurrence. The southern winds are like the sirocco of Italy. They are most frequent towards the end of summer, and dissolve in a few hours an immense quantity of snow, which about that season begins to cover the less elevated mountains, and the volume of water thus conveyed to the rivers produces extensive inundations in some parts of the valleys.

Natural Products.—The richest lands are in the valleys of the Inn and Adige. Wheat, rye, barley, and oats are cultivated. In some parts buckwheat is grown. Millet is also grown, but not extensively. Indian corn is the principal object of agriculture in the southern valleys, and potatoes are cultivated both in the north and the south. Hops grow wild, and tobacco is cultivated to some extent in the southern valleys. Flax and hemp are grown. Fruit trees abound, and large quantities of fruits are exported to Bavaria. Near Trent are plantations of fig trees, and at Roveredo chestnuts are very common. In these parts there are also plantations of the olive and mulberry. A considerable quantity of silk is annually collected. The banks of the Lago di Guarda are enriched with orange groves. Wine is made in large quantities, and some sorts are very good, but they do not keep. Cattle are of middling size and numerous; horses are less in number, and fit only for draught. Sheep and goats are very abundant; but pigs are not much kept. The sides of many of the mountains are covered with forests of beech and fir, according to the elevation. The flocks and herds are driven up to the height of from 5000 to 6000 feet to pasture during the summer months, as in Switzerland. In the north of the country immense numbers of canaries are reared; in fact, the Tyrolese supply nearly all the rest of Europe with those birds. Among the wild animals are chamois, hares, marmots, and partridges, and some large birds of prey, especially eagles. Gold, silver, and copper are found; lead, iron, calamine, and coal mines are worked. There are productive mines of rock-salt near Hall, below Innsbruck. In the southern districts there is also a valuable kind of white marble, which is much worked.

Population.—Though the inhabitants are industrious, Tyrol is not a manufacturing country. The women spin flax, weave linen, knit caps and stockings, make baskets and straw hats for home use, and there are glass and paper factories at Innsbruck. Carpets and gloves are also manufactured, and wooden wares are made very extensively during the winter by the peasantry. The exports are chiefly cattle, cheese, timber, wine, tobacco, silk, iron, and salt, and the imports grain and manufactured goods. The transit trade of Tyrol is considerable, and much facilitated by the admirable roads. Railways have already been made to Innsbruck, Botzen, and Trent, and by one over the Brenner Pass, which was opened in 1867, there is direct communication between Italy and Germany. Many of the inhabitants annually migrate as pedlars or hawkers, owing to the impossibility of obtaining a subsistence in a region where the pasturage is so limited and the sterile ground so extensive. The Tyrolese have a remarkable talent for the fine arts, and education is widely extended. There is a university at Innsbruck. The beneficent and charitable institutions are numerous and well conducted. The inhabitants are all Roman Catholics. There are few countries in which the devotional feeling is so strong; and though it may be often disfigured by superstition, it has doubtless mainly contributed to the formation of that simple, pure, manly, and independent character for which the Tyrolese are remarkably distinguished. Notwithstanding their forced emigration, they are very much attached to their native land, and the inhabitants in the north are specially loyal to the House of Austria, but dislike military service except in defence of their own country. They are all fond of athletic exercises, are admirable as marksmen, and expert chamois hunters. Music and dancing are favourite amusements. In the southern districts of Tyrol the people resemble the Italians in language, manners, and dress; in the north, where they are three times more numerous, they adhere to old German habits and speak the German language. The country has its own provincial diet, which assembles at Innsbruck, and in which the nobility, clergy, and deputies of the towns and rural districts all meet in one chamber.

Chief Towns, &c.—The chief towns are INNSBRUCK and BOTZEN, both of which are described in separate articles. The others which require notice are—*Trient*, *Trento*, or *Trent*, situated on the Adige, 46 miles from Verona, in a beautiful and fertile valley surrounded by high mountains. The houses are very high, with flat

roofs, the streets tolerably wide and well paved, with broad flat pavements for pedestrians. Altogether the town is thoroughly Italian in appearance, and with its embattled walls and numerous spires and towers it looks very imposing when seen from a distance. It is traversed by canals in which streams of pure water constantly circulate, and contribute both to health and cleanliness. It contains a fine square, the 'Piazza Grande,' in the centre of which is a handsome fountain of red marble. Of the churches the most remarkable is the cathedral, a large edifice in the old Greek style, entirely of marble, which was begun in the tenth and finished in the sixteenth century. The church of Santa Maria Maggiore, built entirely of red marble, is memorable as having been the place in which the Council of Trent held its sittings from 1545 to 1562. The church of the Jesuits is richly ornamented with foreign marble. Among the other buildings are two episcopal palaces, fine court-house, capacious theatre, a number of elegant private palaces, convents, ecclesiastical seminary, gymnasium, school of design, foundling hospital, ordinary hospital, and several other charities. Near the town is the Palace Buonconsiglio, a fine specimen of the feudal architecture of North Italy, but now used as a barrack. Trent is the residence of a bishop; it has 14,000 inhabitants, whose occupations are the silk manufacture and the cultivation of the vine. There are in the city extensive sugar refineries, a large imperial tobacco manufactory, and many distilleries of brandy and spirits of wine. The town is also the seat of a very extensive transit trade between Italy and Germany. The river on which it stands is crossed by a wooden bridge 146 feet in length. *Roveredo* is 12 miles by railway S. from Trent on the Leno, near the left bank of the Adige, and has 12,000 inhabitants. This town occupies a most beautiful and picturesque site, and has many handsome houses, mostly built of marble; the new street, Corso Nuovo, in particular is adorned with fine edifices; the theatre stands at one extremity of it. The castle, which is surrounded with high walls, and the church of Santa Maria del Carmine, are worthy of notice. Roveredo has a gymnasium, a public library, civil, criminal, and commercial tribunals, and some charitable institutions. It is one of the most flourishing towns in the Tyrol, and has between sixty and seventy factories, employing nearly 3000 hands, for different branches of the silk business. There are also manufactories of leather and tobacco, and a very considerable transit trade. *Bregenz*, a frontier town, capital of the north-western district of Vorarlberg, at the eastern extremity of the Lake of Constance, between the Swiss and Bavarian territories, is 80 miles W.N.W. of Innsbruck. Population, 4000. It has some cotton manufactories, with an active transit trade; it exports a large number of ready-made wooden houses for the Alpine districts of Switzerland, and vine-poles for the vineyards on the shores of the lake. From the ruins of the castle of Hohenbregenz, on a hill near Bregenz, a very beautiful prospect is obtained of the lake and surrounding country. The town is one of the oldest in southern Germany, and was formerly very strongly fortified.

History.—Tyrol anciently formed the eastern part of the province of Rhætia, and was conquered by the Romans, 15 B.C. When the power of the Western empire decayed, it became the favourite quarry of the warlike German tribes, until, after long years of turbulence and disorder, the northern valleys were permanently occupied by the Bavarian, and the southern valleys by the Lombard races. The Bavarian valleys were subdivided into *gaus*, each of which owned its own feudal chieftain, while acknowledging the general supremacy of the dukes of Bavaria. In the course of time one of these feudal lords rose to the position of paramount ruler, under the title of the count of Tyrol, and his descendants retained the principality until it passed by the marriage of Margaret, the heiress of the last count, in 1359, to an Austrian archduke. The Lombard valley, meanwhile, had fallen to the see of Trent.

The province became an appanage of the younger or Tyrol branch of the imperial house of Germany, which came to the throne in 1618, in the person of Maximilian II. In 1805 the German Tyrol was conquered by the French under Marshal Ney, who forced the passage of Scharnitz, the ancient *Porta Claudia*, and captured Innsbruck. The treaty of Vienna ceded the Tyrol to France, and Napoleon united it to Bavaria, in recognition of the services rendered by his Bavarian allies, but greatly to the discontent of the Tyrolese, who were then and ever have been magnanimously faithful to the Austrian crown. This discontent gradually increased, until it broke out into an open insurrection in 1809, under the leadership of Andreas Hofer, an innkeeper, but a man of undaunted bravery and singular military ability. He was born on the 22nd November, 1767, so that he was in the forty-second year of his age when the revolt broke out. 'His frame was herculean, his shoulders broad, his strength surpassing; but, like most persons long accustomed to climbing mountains, his carriage was somewhat impaired by a habitual stoop. His talents and acquirements were of a superior order; but his parts were solid rather than brilliant, and he evinced, in its merits equally as its defects, the true German character. Honest and confiding, tenacious of custom, attached to antiquity, ignorant of present times, benevolent in disposition; he was at the same time pious and patriotic, and ready to lay down the last drop of his blood in defence of his religion and emperor.'

Hofer was assisted by two men of scarcely inferior capacity, Spechbacher, a substantial yeoman, and Martin Tanier, a captain in the militia. At their summons the Tyrolese, enthusiastic, united, and determined, rose on behalf of the old claims of the Austrian house. It was on the 8th of April, 1809, that the signal was given, and the inhabitants everywhere responded to it; and with their redoubtable rifles on their shoulders descended every glen and ravine, till their accumulated force, gaining strength at every step as it advanced, rolled in an impetuous torrent down the great valleys of the Inn, the Etsch, and the Adige.

Hofer first encountered the Bavarians on the plain of the Sterzinger Moos, and inflicted upon them a severe defeat, capturing 390, and killing 240. On the 11th, another body of the Tyrolese, under Steiner, drove the enemy out of Innsbruck, and hoisted the Austrian flag upon its walls. On the following day they defeated the French, under General Bisson, and compelled them to capitulate. The fortress of Hall, on the Inn, was next stormed by Spechbacher; and in the short space of one week the province was entirely delivered from the enemy, and all its fortresses, except Kufstein, recovered. The effect of these victories, says Alison, was to liberate the southern as well as northern Tyrol; for the French troops were so much discouraged by their reverses that they evacuated both Trent and Roveredo, and fell back to the neighbourhood of Verona. And had the Tyrolese been effectively supported by the Austrian government, a blow might have been dealt to the power and prestige of Napoleon, calculated to have accelerated the deliver-

ance of Europe from the incubus of his despotism. But the Archduke John, by a series of blunders, allowed Napoleon to pour into the Tyrol a strong French force of 15,000 men, under General Baraguay d'Hilliers, while another army, under Lefebvre, ascended the valley of the Inn, marking its progress by the most terrible atrocities. Lefebvre recaptured Innsbruck, but Hofer immediately marched to its relief. In its neighbourhood a desperate struggle ensued. The Tyrolese were superior in numbers, but wholly undisciplined, without cavalry and artillery, and almost without ammunition. Their furious valour, however, proved irresistible, and the results of the battle was to place Innsbruck once more in their hands, and again to free the Tyrol from the presence of its enemies.

But the Archduke John, while these glorious events were taking place, was rapidly retiring into Hungary, and the French, under Baraguay d'Hilliers, continued their advance. The Tyrolese, however, rejoicing in their successive victories, deemed themselves secure from further disasters. But meanwhile, the Austrians were defeated on the fatal field of Wagram, their capital was again occupied by the French emperor, and a second treaty of Vienna for a second time abandoned to his vengeance the unhappy Tyrol. The Austrian garrisons were withdrawn, and the peasantry left unaided to struggle against the overwhelming forces of the French. Hofer refused to submit when called upon by Davoust to appear at Innsbruck on the 11th of August, and returned for his only answer, 'He would come, but it would be at the head of 10,000 skilful marksmen.' On the 4th of August Haspinger attacked the advanced guard of the French and Bavarians in the ravine of the Etsch, caught them in a murderous ambuscade, and completely defeated them. Descending the valley of Passeyr he joined his forces with those of Spechbacher, and at Steinach threw himself upon the French army, under Lefebvre, with such fury, that the French fell into a disgraceful rout, and fled pellmell into Innsbruck, abandoning twenty-five pieces of cannon, and their whole ammunition.

Similar successes attended the arms of the Tyrolese in other quarters, and emboldened and defiant they gathered in great numbers on Mount Ysel, under the standard of their heroic leader. Lefebvre, burning to avenge his disgrace, collected all the troops he could gather on the bank of the Inn, between Innsbruck and the mountains, and with a well equipped army of 23,000 foot, 2000 horse, and 40 guns, awaited the attack of the peasantry. For long the contest was undecided, the superior discipline and admirable artillery of the French prevailing at first over the impetuous but disorderly assaults and deadly aim of the mountaineers. But towards nightfall the French and Bavarians began to give way, and were pursued with great slaughter into the town. They lost 6000 men, while on the side of the conquerors no more than 900 had fallen.

This was the last burst of sunshine that gilded the arms of the Tyrolese. In their simplicity they thought their victory had decided the contest, and for the most part returned to their own homes. Meanwhile Napoleon, now thoroughly roused, prepared such immense forces for a renewed attack on the country, as rendered its subjugation a matter of certainty. Pouring into the Tyrol they overran it in every direction, and though the peasantry continued to resist for three months longer, yet the desertion of Austria deprived them of much of their enthusiasm. The invaders swept the valley of the Inn with fire and sword, and no course was left for the gallant Hofer but submission. He was betrayed into the hands of the French by one Donay, who had been his intimate friend; was removed to Mantua, and contrary to all the principles of justice, tried by court-martial, and condemned to imprisonment. Napoleon, however, telegraphed peremptory orders that he should be put to death within twenty-four hours, that Austria might have no time to intrigue in his behalf. He met his cruel death (February 20, 1810) with an intrepidity worthy of his heroic career. His family, in 1819, were ennobled by the Austrian government, who also caused a statue to be erected to his memory at Innsbruck in 1834.

The treaty of Paris restored the Tyrol to Austria. Of late years the inhabitants of the southern or Trentine Tyrol have manifested Italian proclivities; and it was supposed that one of the results of the war between Prussia and Italy against Austria in 1866, would have been to hand over to Italy a province with which nature seems to have designed its union. No change, however, took place in the ancient boundaries. In the Italian war of 1859 the northern Tyrol was conspicuously loyal to the Austrian crown, and from its valleys were recruited the most skilful and daring sharpshooters in the Austrian army.

(*Die Oesterreichische National Encyclopädie*; R. v. Jenny, *Handbuch für Reisende durch Oesterreich*; *Almanach de Gotha*, 1868; *Imperial Gazetteer*.)

TYRONE, an inland county in the province of Ulster, in Ireland, is bounded N. and N.E. by Londonderry, E. by Lough Neagh, S.E. by Armagh, S. by Monaghan, S.W. by Fermanagh, and W. and N.W. by Donegal. Its greatest length E. to W. is 57 miles; its greatest breadth N. to S. is 48 miles. The county lies between 54° 19′ and 54° 57′ N. lat., and 6° 35′ and 7° 56′ W. long. The area is 1260 square miles or 806,295 acres, of which 450,286 are arable, 311,867 uncultivated, 11,981 in plantations, 710 in towns, and 31,796 under water. The population in 1851 was 255,819; in 1861 it had decreased to 238,500, of whom 103,752 were Protestants, and 134,716 Roman Catholics.

Surface, Geology, and Rivers.—This county lies, for the most part, between the two mountainous districts which cross Ulster from east to west. The northernmost of these districts (that of Antrim, Londonderry, and Donegal) encroaches upon the northern border; and the southernmost (that of Down, Armagh, Monaghan, and Fermanagh) on the southern. Outlying groups of mountains occupy portions of the intermediate district, especially on the west, where they extend nearly across the county. Another group, connecting the two great mountain districts, crosses the county a little to the eastward of the centre, and divides the lower ground into two parts—the plain or basin of Omagh in the centre, and that of Lough Neagh on the east. [Neagh, Lough.] The highest mountains are Slievh Sawel, 2236 feet, and Mullagh Clogher, 2083 feet.

The plain of Lough Neagh rises gradually from the shore of the lough westward towards the mountains which separate it from the plain of Omagh. The part adjacent to the lough is occupied by tertiary formations, consisting of beds of white, brown, and greenish-blue clay, alternating with white and gray sand: they have been bored in some places to the depth of 294 feet without reaching the subjacent formations. To the north-west of the tertiary beds, the secondary formation, chalk, greensand, and lias, crop out, being covered in places by masses of tabular trap. These are succeeded by the red marl or new red sandstone, which on the south-west immediately succeeds the tertiary beds.

well paved. It contains a church, Roman Catholic chapel, two Methodist and two Presbyterian chapels.

Omagh, the assize town, 110 miles N.W. by N. from Dublin by the road, is situated on the south bank of the Camowen, immediately below the junction of the Drumragh, and consists of one principal and some smaller streets. It contains a court-house, gaol, church, and Roman Catholic, Presbyterian, and Methodist chapels. The town is situated on an eminence, and the principal street running down the side of the hill is inconveniently steep. The court-house is conspicuous for its elevated situation. The gaol is a large modern building on the north side of the town. The business is confined to fairs, weekly markets, and the retail trade of the surrounding populous districts. Population, 3662.

Stewartstown, a market town, 27 miles W. from Omagh, consists of three streets, which meet in a large central market-place. It is a well-built thriving town, and contains a parish church, a Roman Catholic and a Presbyterian chapel. Population, 1041.

Strabane, 18 miles N.N.W. from Omagh, and 130 miles by railway from Dublin, consists of a number of streets irregularly built on the north-east bank of the Mournes a little above the junction of the Finn. The town is situated in a fine valley, inclosed by lofty mountains, and is on the railway from Enniskillen to Londonderry. A bridge over the river connects the town with a small suburb on the opposite bank, in the county of Donegal. The houses are generally well built, and many of them handsome. There are a parish church, two Roman Catholic chapels, one of which is in the suburb beyond the river, three chapels for Presbyterians and two for Methodists, a court-house, and a bridewell. Corn (for which Strabane has the most important market in the county), salt-beef and pork, butter, eggs, and poultry, are exported; and timber, staves, iron, groceries, and general merchandise are imported. The manufacture of linen and the business of bleaching are carried on very extensively in the town and neighbourhood. On the Foyle, below the town, is an important salmon fishery. Trade is facilitated by the Strabane Canal, connected with the Foyle, the basin of which is adjacent to the town, and has good wharfs and quays. Population, 4863.

History.—This county seems to have been included in the territory of the Darnii, a nation mentioned by Ptolemæus. By the Irish it appears to have been called Tir-Oen, modernized Tyrone. It was in the northern Hy-Niellia (or country of the O'Neills), which comprehended also a large part of Donegal. The O'Neills were kings in Ireland antecedent to Christianity, and were chiefs of Tyrone when the rebellion of 1597 broke out under their auspices.

Tyrone was formed into a county in 1584, but the first sheriff was not appointed until after the close of 1603. It was comprehended in the great settlement made in Ulster in the following years, and was, in great part, parcelled out among 'undertakers' (persons who undertook to form settlements or colonies), partly Scotch, and partly English.

TYRTÆUS, the second great elegiac poet of the Greeks, whose strains were celebrated for their martial spirit. He assisted the Spartans in their second Messenian War, which is placed by Pausanias between the years B.C. 685 and 668, while others place its commencement about the year B.C. 660, and even later. His birthplace is uncertain. The story is that he was residing in Attica, when the Spartans, who were engaged in the second Messenian War, sent to Athens, pursuant to an oracle, to ask the Athenians to send them an adviser; and Tyrtæus was sent, a schoolmaster, and lame. However, the schoolmaster turned out more useful than was expected, for by his elegies he inspired the Spartans with such courage that they were victorious over their enemies. He also composed an elegy on Eunòmia, or Good Order, for the purpose of settling internal dissensions among the people. His war songs were very popular, and sung for many centuries after his time. Three of this kind are extant, but it is very improbable that they are in their genuine form. The remains are contained in Bergk's 'Greek Lyric Poets,' and in other collections. They were translated into English verse by R. Polwhele, 1786–1792.

TYRUS, or TYRE, a city on the coast of Phœnicia, 200 stadia according to Strabo, 24 miles, according to the Antonine Itinerary, S. of Sidon. It appears to have been of less antiquity than Sidon, but it became the chief city of Phœnicia. In the time of David and Solomon it was a great commercial emporium, and was governed by a king (Hiram), who maintained friendly relations with those princes, and assisted Solomon in building the temple and his palaces, and in his naval expeditions. About half a century later Ahab married Jezebel, the daughter of the king of Tyre and Sidon. It is repeatedly mentioned by the Hebrew prophets, who speak of its strength, wealth, beauty, and its flourishing commerce, and threaten it with destruction for its pride.

The original site of Tyre was on the mainland, but another city of the same name was built on a narrow island, about a mile in length, parallel to the shore, and nearly half a mile distant from it, and not quite 4 miles from the ancient city. Shalmaneser, the Assyrian conqueror, captured ancient Tyre; he also blockaded the insular city for five years, but at last raised the siege (about B.C. 720–715). The insular city was again beleaguered by Nebuchadnezzar. It was taken, after a siege of seven months, by Alexander the Great (B.C. 332). It afterwards came under the power of the Seleúcidæ, and subsequently under that of the Romans. Septimius Sevérus sent thither a Roman colony, as his medals show. At a later period it became the seat of a Christian bishopric. During the Crusades it suffered several sieges, and remained in the hands of the Christians much longer than any other city of Phœnicia. Its fortifications were almost entirely destroyed in those wars, but its celebrated purple dyes still retained for it much of its former prosperity till the commencement of the sixteenth century, when it fell into the hands of the Turks and rapidly decayed. It is now only an insignificant village named Sûr, with a population of about 4000.

The island on which it stands has been a peninsula ever since Alexander constructed the mole for the purpose of attacking it.

TYRWHITT, THOMAS, was the eldest son of the Rev. Dr. Robert Tyrwhitt, who at the time of the birth of his son, in London, March 29, 1730, was rector of St James', Westminster. Thomas was educated at Eton, whence he went to Queen's College, Oxford, 1747. He resided at Oxford as a fellow of Merton till 1762, when, resigning his fellowship, he repaired to London, and entered upon the duties of the office of clerk of the House of Commons. Finding the fatigue too great for his health, he relinquished this appointment in 1768, and devoted the rest of his life to literary pursuits. Mr. Tyrwhitt, who was greatly beloved for his amiable character, died August 15, 1786. He was a man of great learning, industry, and accuracy, and he had also good taste and critical acuteness. His edition of 'The

Canterbury Tales of Chaucer, with Dissertations,' &c., has become the standard. His edition of Aristotle's 'Poetics' was published after his death, Oxford, 1794.

TYSSENS, PETER, was born at Antwerp in 1625. His works, both in portrait and history, are very numerous in his own country, but there are few elsewhere. The Assumption of the Virgin, over the great altar of the church of St. James at Antwerp, is generally considered his masterpiece. His drawing was vigorous and correct, his colouring good, and his composition very spirited. In 1661 Tyssens was made director of the academy of Antwerp. He died in 1692.

His two sons, Nicholas and Augustine, were also distinguished painters in their respective lines. Nicholas Tyssens was born at Antwerp in 1660; spent several years in Italy, and in 1670 was employed in the service of the elector-palatine at Düsseldorf. He visited London, where he is said to have died in 1719. He painted armour, flowers, and birds. Augustine Tyssens was born at Antwerp in 1662, and executed many pictures in the style of Berghem. He died in 1722.

TYTLER, ALEXANDER FRASER, styled Lord Woodhouselee, was born at Edinburgh, October 15, 1747, and was the eldest son of William Tytler. After some preparatory education in England, he entered the University of Edinburgh in 1765, with the view of studying for the bar. He was admitted an advocate in 1770. His first publication was in 1778, a supplementary (folio) volume to Lord Kames' 'Dictionary of Decisions,' bringing down the work to that date. In 1780 Tytler was joint professor (with John Pringle), and in 1786 sole professor, of universal history and Roman antiquities in the University of Edinburgh. This appointment led to the publication, in 1782, of his 'Outlines of a Course of Lectures,' afterwards expanded into 'Elements of General History,' 2 vols. 8vo, Edinburgh, 1801. In 1790 Mr. Tytler was promoted to the office of judge-admiral of Scotland; and the same year he read before the Royal Society of Edinburgh a series of papers, which he soon after published anonymously, under the title of 'An Essay on the Principles of Translation.' This was followed by various other publications. In 1802 he was raised to the bench of the Court of Session, when he took the title of Lord Woodhouselee. In 1807 he published his last work, 'Memoirs of the Life and Writings of Henry Home, Lord Kames,' 2 vols. 4to, Edinburgh. In 1811 Lord Woodhouselee was appointed a lord justiciary. He died January 4, 1813.

TYTLER, PATRICK FRASER, fourth and youngest son of Alexander Fraser Tytler by a daughter of Fraser of Balnain, was born at Edinburgh in 1791. He was educated partly at a private school at Chobham, partly at the high school and university of his native city; and having passed through the usual course of literary and philosophical studies requisite for a knowledge of the law, he was called to the Scottish bar in 1813, a few months after the death of his father. He obtained some professional employment, and was even made a junior crown counsel; but his youthful years had been passed in the midst of a circle of eminent literary friends who frequented his father's hospitable mansion, and it soon began to appear that law had few charms for him compared with literature and historical research. He early became a contributor to the *Edinburgh Re* *Blackwood's Magazine*, and in 1819 appeared independent work, 'The Life of the Admirable which was very favourably received by th His next literary production was a 'Life of Si Craig of Riccarton,' published in 1823, wh years later was followed by a 'Life of Wyc English Reformer.' About this period he wa by Sir Walter Scott to undertake the prepara history of Scotland, which became the main t life. The first volume appeared in 1828, and and last volume in the winter of 1843. Tytle of the first to perceive the vast importance of in the state-paper office towards the formation o view of the ancient history of the country; several exploratory visits he ultimately took up dence in London, in order that he might be source of historical knowledge. He employ materials with unwearied industry, patience, and good sense; but his ecclesiastical and poli dilections made it very difficult for him to sy with the struggles of John Knox and his s and his Presbyterian countrymen have compla without reason, that he has done scanty justi Scottish reformers and their ecclesiastical p 1844, under the administration of Sir Robert was rewarded with a literary pension of 200*l.*, a frequent guest at Windsor. But the un toils of eighteen years began now to affect his tion; his health gave way, and he spent the r of his life mostly on the Continent in a vain to recruit his shattered nervous system. H Christmas eve, 1849, in his fifty-ninth year. his 'History of Scotland,' Mr. Tytler was the 'Lives of Scottish Worthies,' 3 vols. 12mo; ' View of the Progress of Discovery on the more Coasts of America;' 'Life of Sir Walter Raleig of Henry VIII.,' &c. He wrote also some son dinners of the Bannatyne Club and of the M yeomanry cavalry. In private life Mr. Tytler tinguished by his amiability and cheerful pie was twice married, and left two sons and a Miss Sarah Tytler, who is distinguished as a writer of fiction.

TYTLER, WILLIAM, was born at Edinbu ober 24, 1711. After an education at the hi and University of Edinburgh, he was admitted to the signet in 1742; and he practised that the legal profession till his death, September Mr. Tytler, besides being an accomplished and distinguished for his taste in all the fine the author of several literary works, the chief an 'Inquiry, Historical and Critical, into the against Mary Queen of Scots,' was first printed volume in 1759. Among his other publicati 'A Dissertation on the Marriage of Queen M Earl of Bothwell,' in the 'Transactions of th of Antiquaries of Scotland,' vol. i., 4to, 17 Poetical Remains of James I. of Scotland,' 8 burgh, 1783; and 'A Dissertation on Scottis subjoined to Arnott's 'History of Edinburgh.'

TZAR. [CZAR.]

TZARINA. [CZARINA.]

TZINTZONTZAN. [MEXICO.]

U is at one extremity of the series of vowel sounds, lying next to the vowel *o*. In the Hebrew alphabet it does not appear, and was probably originally wanting in that of the Greek tongue.

1. The close connection between this vowel and the vowel *o* might be inferred from their relative position in the vocal gamut.

2. U long is interchangeable with the diphthongs *oe* or *oi* in Latin. Thus *cūra*, *ūter*, *ūnus*, *mūnio*, *mūrus*, often appear in the older dialects of that language, as *coira* or *coera*, *oitor* or *oetor*, *oenus*, *moinio* or *moenio*, *moerus*. In the same way *foetus*, *foecundus*, are formed from the old verb *fuo*, by the addition of the common suffixes *tus* and *cundus*, which are so often attached to verbs. The variation in the forms of *Poeni* and *Punicus* is an example of the same principle.

3. *U* with *au*, as in the Latin forms *claudo* and *cludo*, and the Latin *mus* compared with the German *maus*, a *mouse*.

4. A short *u* with *ă*. Thus those who represent the Arabic article in English characters are divided between *al* and *ul*.

5. A short *u* with *ĕ*. Thus the Greek tongue, or rather pen, prefers the syllable *el* where the Latin writes *ul*, particularly in the penult syllable: as Σικελος, Siculus. The Germans again prefer *el*. Hence the Latin *tabula*, *fabula*, appear in German as *tafel*, *fabel*. The vowel *u* is also preferred by the Romans before *n*, if a *d* or *t* follow. Hence *rediens* has a genitive *redeuntis*, and *faciundus* is as common as *faciendus*.

6. A short *u* with ĭ. [See I.]

7. For the interchange of *du* with *b* and *v*, see B, D.

8. For the interchange of *l* with *u*, see L.

9. *Ou* not unfrequently results from *on*, particularly in the Greek language, as οδους for οδονς, τυπτουσι for τυπτονσι; and the accusative plural of the second declension, οικους, is a corruption of οικονς, being formed from the singular οικον by the addition of the affix for plurality.

10. For the loss of an initial *c* before *u*, see C.

11. The insertion by the English of a *y* sound before *u* is not limited to an initial *u*, as in *union*, *university*; but occurs in the middle of words. Thus, in Norfolk *true* is sometimes pronounced *tryoo*. It is probably in this way that the English have adopted the orthography *ew* in so many words, as *new*, *few*.

12. For the intimate connection of *u* with V and W, see those letters.

U'BEDA, a city in the province of Jaen, in Spain, situated at the foot of a mountain, in 37° 56′ N. lat., 3° 24′ W. long., about 25 miles N.E. from the city of Jaen, has 15,000 inhabitants, mostly employed in agricultural pursuits. The town is well built, with several wide streets and some handsome squares. The public buildings remarkable for their architecture are—the cathedral, formerly a mosque; the church of San Salvador, the Dominican convent in the Plaza del Llano, the hospital, the exchange, and the building called El Exido, at the commencement of the road to Baeza. Coarse woollens, blankets, hats, and porous vessels made of red and white clay, are the chief manufactures. The plain on which Ubeda stands is one of the most fertile parts of Andalusia, and yields abundant crops of grain and oil, which are carried into the interior. Ubeda has an annual fair on the 29th of September, in commemoration of the taking of the city from the Moors in 1239. Under them it is said to have contained 70,000 inhabitants.

UBES, ST., or SETUBAL. [Estremadura, *Portuguese.*]

UBIQUITA'RIANS, or U'BIQUISTS (Lat. *ubique*, 'everywhere'), a sect of early Lutherans, whose distinguishing doctrine was, that Jesus Christ was everywhere at the same time. The sect arose in 1560, and Melanchthon strongly opposed it, as well as the universities of Wirtemberg and Leipzig. But it was all in vain. In 1777 the leaders of the sect published a formula of faith, wherein the ubiquity of Christ was established—a doctrine which still prevails in Germany and elsewhere.

UCKFIELD. [Sussex.]

UDAL TENURE. The Norwegian term 'Udal,' or 'odel,' appears to be the same as the German 'adel,' or 'noble.' Tenure is an improper name as applied to Udal land, for the land so called in Norway is not held by any tenure, but is free from all services. There is neither superior nor vassal, nor any of the consequences of such feudal relation as exist in many countries in Europe.

Udal right, in the law of Scotland, means that right in land which may be completed without charter and sasine, by undisturbed possession, provable by witnesses before an inquest. Though dependent on the crown as superior, the vassal pays only a tribute called skat. The right is said to have been the old tenure prevalent in Britain before the feudal system was introduced, and prevails chiefly in Orkney and Shetland. The lands held on udal right are now commonly converted into feus.

UDALL, NICHOLAS, was born in Hampshire in 1506. He became a scholar of Corpus Christi College, Oxford, in 1520, B.A. in 1524, and M.A. in 1534. He was master of Eton and subsequently of Westminster School. In the early part of the reign of Edward VI. he was appointed to a canonry at Windsor. He died in 1564.

Udall published 'Flovres for Latyne Spekynge,' London, 1533, and some translations; but he is chiefly remarkable for his comedy of 'Ralph Royster Doyster,' which is noticed in the article Great Britain, under the head of *English Drama*.

UDDEVALLA. [Sweden.]

U'DINE, a district of northern Italy, in the government of Venice, is described under Friuli, with which it is nearly coincident. The population is 55,300.

Udine, the capital of Udine or Friuli, situated in an elevated plain, near the foot of the Carnic Alps, about 20 miles from the Adriatic, and on the railway from Venice to Vienna, has about 27,000 inhabitants. It is a walled town, between 4 and 5 miles in circumference, and has wide and handsome streets. Upon an eminence in the middle is the old castle, once the residence of the

patriarchs of Aquileia, who were for several centuries lords of Friuli. It is now used as a prison. Udine gives title to a bishop; it has some fine churches, especially the cathedral, distinguished for its marble pillars, carvings, and pictures; and the church of San Pietro Martire, several palaces, a handsome square lined with arcades, and adorned with a fountain, a gymnasium, lyceum, clerical seminary, several public libraries, two museums, agricultural academy, philharmonic institute, monte-di-pietà, and theatre. The public palace is in imitation of the Doge's palace at Venice, and the buildings generally resemble those of the mother city so much that Udine is sometimes called Venice in miniature. A considerable trade in silk, the produce of the country, is carried on. There are silk, paper, and leather manufactories, a sugar refinery, and liqueur distillery. In the vicinity, and approached by an avenue of stately plane trees, is the Campo Santo, which, from the taste displayed in its arrangements, and the number and elegance of its monuments, ranks as one of the finest cemeteries in Europe. At the village of Campo Formio, about 2 miles from the town, was concluded the peace between Austria and France, in 1797, by which Venetia was ceded to the latter. There is a monument to commemorate this event in the market square of Udine.

UDINE, GIOVANNI DA. [NANNI.]

UIST. [HEBRIDES.]

UKASE, an ordinance of the czar of Russia which has all the force of law within the bounds of his empire.

UKRAINE is a name formerly given to the territory which now forms the governments of Kiev, Podolia, Poltowa, and Charkow in Russia. It is remarkable for its rich pastures, and a fine breed of horses and horned cattle. It is described under KIEV; PODOLIA; POLTAWA; SLOBODE UKRAINE.

ULEABORG. [FINLAND.]

ULEMA, a college or corporation of 'learned men,' consisting of the three classes of the Turkish priesthood, as the *imans*, or ministers of religion; the *muftis*, or doctors of law; and the *cadis*, or magistrates. Candidates for admission into the body are educated at the different imperial *medresses*, or colleges. The president is called the *Sheikh ul Islam*, and resides at Constantinople.

ULEX, a genus of plants belonging to the section *Loteæ*, of the natural order *Leguminosæ*. The species are branched evergreen shrubs, furnished with spines, and bearing yellow flowers. *Ulex Europæus*, Common Furze, Gorse, or Whin, is an erect evergreen shrub, with yellow flowers, which appear in greatest abundance from February to May, though in mild seasons it may be seen in blossom all the year round. It is sometimes used for hedges, for which it is well adapted, especially where the hawthorn will not thrive. The hedges should be made wide, and regularly clipped. *U. nanus*, the Dwarf or French Furze, is a native of Britain, also of the west of France, in poor gravelly soils, but not common on the Continent. It is also found in Ireland. *U. strictus*, the Irish Furze, is an upright plant, seldom flowering. Its branches are soft and succulent; and in size and character it stands between the two foregoing species.

ULLAGE, in Commerce, is the wantage or deficiency in casks containing liquids; or in other words, the amount a cask wants of being full.

ULLESWATER. [WESTMORELAND.]

ULM, a city of Würtemberg and, up to 1866, one of the chief fortresses of the late German Confederation, is situated in 48° 24′ N. lat., 10° E. long., in a beautiful and fertile country at the south-easte
Swabian Alps, and on the left bank of
which is here joined by the Blau. The
very strongly fortified, is of elliptical sh
ground on which it stands is tolerably leve
of the old German towns, it has in general
crooked streets, and antique-looking woo
there are, however, some broad handsome
flag-pavement for foot passengers. Wit
there are three stone and two wooden brid
Blau; and a handsome stone bridge over
which connects the town with the Bavari
New Ulm, on the right bank of the river,
in 1832. Ulm has many buildings wort
The Minster, a very fine specimen of an
architecture, and one of the largest and loft
in Germany, is 485 feet long, including th
feet broad, and the middle aisle, 150 feet
steeple is 337 feet high, but has never be
the height of the original design. In the
many curious monuments and works of ar
by old German masters, admirable carved w
glass windows, and a remarkably fine
building was commenced in 1377 and c
1494. It is now used as a Protestant plac
The town-house, a very ancient and spa
contains many fine paintings; in the vault
are the archives, with many valuable hist
ments. The Deutsche-Haus, containing t
public offices, is considered the handsome
regular building in the city. The theatr
externally with Corinthian columns. Besi
ster there are two Lutheran and two Rom
churches. There are in Ulm a gymnasium
a city library, a large hospital, and numero
institutions. In 1866 the city had 25,000
who manufacture linen, cotton, woollen,
leather, snuffs, tobacco, tobacco-pipes, po
The town is also noted for a kind of p
Ulmer bread; there are some breweries, an
ing yards and printing establishments.
carried on in the vicinity, and there are so
gardens near the city—asparagus especiall
tivated in very large quantities. There is
siderable transit trade. Steamers and barges
the town and Vienna. Ulm capitulated
November 17, 1805, General Mack and t
garrison of 28,000 men being made priso
without having fired a shot. The affair cr
picion of treachery.

ULMA'CEÆ, a natural order of plants
Lindley's rectembryose group of incomple
The species are natives of the north of Asia
tains of India, of North America, China,
This order is by most botanists made a se
natural order *Urticaceæ*. It was, howeve
by Mirbel, and he has been followed by Li
genera are *Planera*, *Abelicea*, *Ulmus*, *Cel*
and *Mertensia*.

Most of the species are trees, whose tim
very valuable.

Planera Richardi is a native of Siberia,
found between the Black and Caspian se
35° and 47°. In its native districts it atta
of from 50 to 80 feet. The trunk is straig
upright, and it is often 30 or 40 feet from
to the point where it throws off its bra
Gmelini, Gmelin's Planera, is a native of Nor
in Kentucky, Tennessee, the banks of the

and in all the southern states. The wood is hard and strong, but it appears to be little used.

Celtis australis, the European Nettle tree, grows to the height of 40 feet, and is indigenous to the south of Europe and the north of Africa. The fruit, when ripe, is blackish, about the size of the fruit of the bird-cherry, and edible. The wood is highly prized. *C. occidentalis*, the North American Nettle tree, is found in woods and near rivers from Canada to the Carolinas. The fruit, like that of the last species, is edible, but not very grateful to the British palate. *C. crassifolia*, the Huckberry, is another North American species, and is closely allied to the last, and some botanists even think them identical. It grows very rapidly. The wood is not of much value, on account of the small size of the trunk; but in America it is used for making the bottoms of chairs, and also for baskets.

ULMIC ACID, or ULMIN. Some trees, and more especially the elm, when it is old, secrete a liquid which dries as it exudes: the residue consists principally of mucilaginous matter, with some carbonate or acetate of potash, and eventually the mucilaginous matter undergoes a change, and, combining with the potash, forms a substance which was first examined by Vauquelin and Klaproth, and Dr. Thomson gave it the name of *Ulmin* (from *Ulmus*, 'the elm'). It is of a deep brown colour, very brittle, and breaks in angular fragments, and is almost insoluble in water. It is insoluble in acidulated water or in saline solutions. It may be procured from soils, rotten leaves, bog-earth, wood soot, or turf, by digesting them in a weak solution of potash; by this a brown-coloured solution of ulmate of potash is formed, from which acids throw down ulmic acid.

Ulmic, or thimic acid (which consists of carbon, hydrogen, and oxygen), is an important element in manures and soils; and what is called *moss-water* owes its peculiar properties to its presence. It forms a powerful manure, especially when combined with lime or with ammonia.

ULMUS, a genus of plants, the type of the natural order *Ulmaceæ*. All the species are trees, and some attain a great size and age. The flowers are small, and the leaves alternate. In most of the species the flowers appear earlier than the leaves; they are disposed in groups and seated on short peduncles. The various species of elm are wild in Europe, North America, India, and China. Nearly twenty have been enumerated by various writers, but it is not at all certain that these are true species. The elm, since the time of the Romans, has been the most commonly cultivated timber tree of Europe. The reason of this is found in its comparatively easy cultivation, the rapidity of its growth, and the readiness with which it flourishes in almost any soil or situation. It also bears transplantation well, and almost at any age. It has, however, its disadvantages: the timber is very apt to shrink or warp, unless it be kept constantly moist, or has been cut down many years before it is used. It is also during its growth very liable to the attacks of insects, which prove destructive to its timber.

Ulmus campestris, the common English or Small-leaved Elm, is a native of the middle and south of Europe, the west of Asia, and Barbary. It is also found abundantly in France, Spain, and Italy. It grows rapidly, and often obtains a height of from 70 to 90 feet, with a trunk 4 or 5 feet in diameter, which size it frequently attains within a hundred years. The *U. campestris* is still common in Italy. On the Continent, generally, the elm does not appear to have been cultivated till recent times, although in England it has been so from time immemorial. In its planting and cultivation two objects are held in view, ornament and use. A great recommendation of the elm is its endurance of a smoky atmosphere, and it will thrive in the vicinity of large towns. The noble elms of the parks of London are a living testimony of its value in this respect. Many of the public avenues in France, Holland, and Great Britain are composed entirely of this tree; and its growing in almost every variety of soil, and requiring but little pruning, are, in addition to its ornamental qualities, strong recommendations.

As a timber tree the uses of the elm are very considerable. The wood loses a great deal by drying; a cubic foot weighing 70 lbs. is, according to Loudon, reduced to 48½ lbs. It is of a brownish colour, is hard and fine-grained, withstands well the action of water, and on this account is used for making pumps, water pipes, &c. It is also used for making the keels of ships. The English elm frequently attains a great age. A tree cut down by Sir Hans Sloane, at Chelsea, was said to have been planted by Queen Elizabeth; it measured 13 feet in circumference, and at one time was 110 feet in height.

Cultivation of the Elm. — The English elm (*U. campestris*) does not perfect its seeds in this country, so that it cannot be propagated by seed. In the south of England the usual way is by layers, or suckers, which are thrown out in great numbers by the superficial roots. Layers are said to produce finer trees than suckers.

Medicinal Properties. — The bark of *Ulmus campestris* is officinal: it should be collected in spring from branches not too old; the outer bark is removed, and the interior, or *liber*, retained for use. It possesses demulcent, tonic, and astringent properties; and taken in full doses it accelerates the pulse, acting ultimately as a diaphoretic and diuretic.

The recorded varieties of *Ulmus campestris* are numerous. Loudon enumerates eighteen.

Ulmus suberosa, the Cork-bark Elm, derives its name from the corky nature of its bark, and is supposed by Selby and others to be only a variety of *U. campestris*.

Ulmus major, the Greater or Dutch Cork-bark Elm, is a finer and more graceful-looking tree than the last. It has larger leaves, and the bark is even more corky.

Ulmus effusa, the Spreading Elm. This is not a British species. It is a native of Russia, where it attains a great size. The wood is hard and durable, and is used where it grows for all the purposes of the common elm.

Ulmus montana, the Mountain, Scotch, or Wych Elm, is more abundant in the northern than the southern parts of England, and it becomes more abundant as it approaches Scotland. In that country this tree forms the most prominent object in its picturesque wooded scenery. It is also a native of Ireland. The leaves of the Wych elm are larger than those of the English elm.

Ulmus glabra, the Smooth-leaved Elm, is sometimes considered a variety of the last species.

ULNA (Lat.; Gr. ὠλένη) is the larger of the two bones of the fore-arm, forming the elbow-joint, and being articulated to the radius and the humerus.

ULODE'NDRON, one generic division of the great group of Lepidodendroid families of plants which occur in the coal formations.

ULPIA'NUS, DOMI'TIUS, a distinguished Roman jurist. The year of his birth is not known. His family is said to have been originally from Tyre. In the joint reign of Septimius Severus and of his son Antoninus

Caracalla (198–211), Ulpian was a writer on law, but more particularly under the sole reign of Caracalla, as appears from various passages in his writings. He was banished by Elagabálus, but the elevation of Alexander Severus to the imperial power in 222 opened to him the road to new honours. He became scriniorum magister and præfectus annónæ, and was a particular favourite of the emperor. He also held the office of prætorius præfecto under Alexander Severus. He was his confidential adviser, and exercised great influence over him. Xiphilinus, the epitomizer of Dion, fixes on Ulpian the imputation of clearing the way for his promotion to the dignity of prætorius præfecto by causing the execution of his predecessors. This fact is not mentioned by any other ancient authority, and it is inconsistent with the character which Lampridius gives Ulpian, whom he calls a good man. He was murdered shortly after, in 228, in the night-time, by the prætorian soldiers, in the palace of Alexander, and in the presence of the emperor and the emperor's mother.

Ulpian was one of the most fertile of the Roman writers on law. His works are only known to us from the 'Florentine Index' and the excerpts in the 'Digest.' His great work 'Ad Edictum' was in eighty-three books. From this and twenty-two other works there are numerous excerpts in the 'Digest,' which amount in the whole to about one-third of that compilation. His style is clear, and more diffuse than that of his great contemporary Paulus.

The fragment entitled 'Domitii Ulpiani Fragmenta' consists of twenty-nine titles, and is a valuable source for our knowledge of Roman law. There is an edition of these fragments by Böcking, Bonn, 1836.

ULSTER, the northernmost of the four provinces into which Ireland is divided. It is bounded on the N. and W. by the Atlantic Ocean, E. by the Irish Sea, S.E. by the province of Leinster, and S.W. by that of Connaught. It is comprehended between 53° 45′ and 55° 25′ N. lat., and between 5° 25′ and 8° 50′ W. long. It comprehends nine counties, the areas and population of which are stated in the article IRELAND.

Ulster is mountainous, and more free from bogs and plains than the other parts of Ireland. Two mountain groups cross the province from east to west. The northernmost, which passes through the counties of Antrim, Londonderry, and Donegal, is divided into three parts by the valleys or depressions through which the Bann and the Foyle reach the sea. The mountains of Donegal are the loftiest: several of the peaks rise to the height of more than 2000 feet; and one (Erigal) is 2460 feet above the level of the sea. The coast of Donegal is very rugged, marked by deep inlets, as Lough Swilly and Lough Foyle (between Donegal and Londonderry), stupendous cliffs, bluff headlands, and numerous islands. The southern mountains commence on the east coast, in the county of Down, where Slievh Donard, one of the Mourne mountains, rises to the height of 2796 feet above the level of the sea. The other mountains in the southern part of the province are lower, and extend through the counties of Monaghan, Cavan, and Fermanagh. A lower and comparatively level district intervenes between the northern and southern mountains, and occupies a considerable part of the counties of Down, Armagh, and Tyrone, extending from Belfast Lough and Strangford Lough on the east, to Lough Erne and Lough Derg on the west. Lough Neagh is in this central low country. [NEAGH, LOUGH.]

The mountains of Donegal and Londonderry are chiefly of mica-slate, except in the north-west of the former county, where they consist of granite and quartz rock. The mountains of Antrim are of tabular trap. The basaltic rocks known as the Giant's Causeway occur on the north coast of this county.

The Mourne mountains are granitic: the other southern mountains consist of grauwacke, grauwacke slate, old red sandstone, yellow conglomerate (the lowest member of the carboniferous limestone series), and millstone-grit.

The principal rivers flow from south to north, rising in the southern mountains, crossing the intermediate low country, and passing through openings in the northern mountains into the Atlantic. Several flow in different directions into Lough Neagh, of which the Bann is the outlet. Others unite in the Foyle. The principal lakes are Lough Neagh, in the centre of the province; and Lough Erne, Lough Derg, Lough Macnean, and Lough Nilly, in the south-west. Belfast Lough, Strangford Lough, and Loughs Larne, Foyle, and Swilly, are land-locked inlets of the sea.

Ulster was one of the five provinces into which, at an early period, Ireland was divided. In it the northern Hy Nialls, or O'Neill's, had their seat. In the Anglo-Norman invasion, the earliest attack upon Ulster was made, in 1177, by John de Courcy, who conquered part or the whole of Ulidia (now the county of Down and part of Antrim), and extended his incursions with various success into other parts of the province. He assumed or received the title of Earl of Ulster; but on his decease his lands and titles were transferred to Hugh de Lacy, and the title was inherited by the De Burgh and Mortimer family. The greater part of the province remained, however, in the hands of the native chieftains until a comparatively late period. Insurrections having, in 1607, led to extensive forfeitures in the six counties of Donegal, Tyrone, Coleraine (now Londonderry), Fermanagh, Cavan, and Armagh, it was determined to bestow them on English or Scotch colonists, 'Servitors in Ireland,' or on natives of Ireland who were to be made freeholders, all termed 'Undertakers,' to whom were severally assigned lots of 1000, 1500, and 2000 English acres, upon different tenures, on condition that they should build on each of the largest (or 2000 acre) grants a castle, and on each of the other grants a brick or stone house, each castle or house surrounded by a strong courtyard or 'bawn;' and should settle or 'plant' a certain number of tenants, who were to be Scotch or English, except on the lands of the 'Irish servitors,' who might take English or Irish tenants at their choice. Large grants were assigned to the corporation and some of the trading companies of the city of London, from which the town and the county of Derry received the distinctive prefix of their name, London-derry.

In consequence of the large infusion of English and Scotch blood in this province, the Celtic race is by no means so pure or numerous as elsewhere in Ireland, and for the same reasons there are not so many Roman Catholics: in fact, they only form a bare majority, the total population of the whole province, in 1861, being 1,910,408, of whom only 963,687 were Roman Catholics. Ulster is the head-quarters of the Irish linen manufacture, the chief seat of which is Belfast.

ULTIMATE ANALYSIS. Chemical analysis may have a two-fold object. In examining a complex body we may purpose to resolve it into the simple elements of which it is composed, or merely into its constituent groups formed by such elements. The former process we term *ultimate*, the latter *proximate* analysis. To take a familiar illustration, the 'proximate' analysis of

a word would resolve it into syllables, whilst the 'ultimate' examination would reduce it to letters.

There are, of course, many cases in which such a distinction is inapplicable, and where any analysis must be at once ultimate and proximate. Thus when two elements combine to form a compound body, there are obviously no intermediate groups to detect. Thus common salt (chloride of sodium), sulphide of iron, water, and the like, can be resolved merely into the simple elementary bodies of which they are composed. It is perfectly possible, also, that three or more simple elements may unite at once to form a compound. So soon, however, as a body can be regarded as formed by the union not of mere simple elements, but of compounds, then its ultimate and proximate analysis become two distinct questions. Thus a proximate analysis of alum would view it as composed of sulphuric acid, alumina, potash, and water, and would show the relative proportions of each. An ultimate analysis of the same body would resolve it into sulphur, oxygen, hydrogen, aluminium, and potassium. In case of complex bodies of an inorganic origin, an ultimate analysis is rarely practically executed, as its result may be inferred with absolute accuracy from the proximate composition. Thus in whatever combination we find, *e.g.*, sulphuric acid, we know that it consists of sulphur and oxygen in certain unvarying proportions.

With organic compounds the case is far different. Here the proximate composition is much less easily ascertained, ultimate analysis affording one of the most important data for its determination. Before, however, submitting any organic matter to ultimate analysis, we should carefully ascertain whether it is a *chemical individual*; otherwise the operation, how accurately soever performed, must be utterly devoid of scientific value. Thus some time ago ultimate analyses of blood, of urine, milk, flesh, tumours, &c., were frequently undertaken, in neglect of the fact that all these are mere fluctuating mixtures, whose *proximate* investigation may indeed be of great utility. Similarly, the ultimate analysis of a sample of opium, showing the relative proportions of oxygen, hydrogen, nitrogen, and carbon, would be a most unprofitable task. An accurate proximate investigation of the various chemical individuals of which this drug is composed, *e.g.*, morphia, codeia, narcotina, &c., showing their presence and the amount of each, is very useful. On the other hand these bodies taken severally, are proper subjects for ultimate analysis which throws light upon their nature and mutual relations. For the method of performing these investigations see ORGANIC ANALYSIS.

ULTIMATUM. The final propositions, conditions, or terms offered in diplomacy as the basis of a treaty. It may be considered as the most favourable terms that can be offered, and its rejection usually puts an end to negotiation.

ULTRA (Latin, 'beyond'). A prefix used to denote those members of a party who carry their opinions to excess; as *ultra*-tories, *ultra*-radicals, *ultra*-liberals. In 1793 those persons were called *ultra*-revolutionists who demanded much more than the constitution allowed.

ULTRAMARINE (Latin, *ultra*, and *mare*, 'the sea'), a well-known blue pigment of extraordinary beauty and great permanence. It was originally, and, indeed, until within a few years, entirely prepared from the lapis lazuli, or lazulite. [LAZULITE.] It is now, however, produced at a very moderate price, and equal in beauty to that obtained from the lazulite. Gmelin considers that sulphuret of sodium is the colouring principle both of the natural mineral and the artificial products. The artificial ultramarine is stated to be prepared by adding freshly-precipitated silica and alumina, mixed with sulphur, to a solution of caustic soda, and the mixture is to be evaporated to dryness: the residue is put into a covered crucible and exposed to a white heat, by which, when the air has partial access to it, a pure blue mass is obtained. The product is reduced to impalpable powder. The proportions of materials to be used are about 36 silica, 36 alumina, 24 soda, and 3 sulphur.

The imports of ultramarine into the United Kingdom in 1866 amounted to 29,866 cwts., value 122,846*l*. Of this quantity, 20,185 cwts. were imported from Holland, 7409 cwts. from Bremen, and the remainder from Hamburg, Belgium, and France. In the same year 2566 cwts., value 9309*l*., were exported.

ULTRAMONTANE. This term is derived from two Latin words, signifying 'beyond the mountains,' and when used with reference to the Roman Catholic Church, it refers to the Italian party residing beyond the Alps, in contradistinction to the Gallican party or French Catholics. [GALLICAN CHURCH.]

The precise relation subsisting between the authority of the pope and that of the general councils is an undetermined question in the Romish Church; the Italian or Ultramontane party elevating the pope to a position of feudal supremacy, and maintaining that his decrees have force in themselves independent of their acceptance by the body of bishops; and the Gallican section maintaining that the pope stands to the episcopal body merely in the position of *primus inter pares*, and that his decrees receive sanction and binding power only through its express or implied assent. Many of the French sovereigns have been engaged in conflicts with the Roman see as to the respective authority of the two powers, and the Ultramontane school has been the opponent of those doctrines and views which favour the right of self-government by national churches. Both parties are represented amongst English Roman Catholics. The Jesuits are most strenuous upholders of Ultramontanism.

ULVA'CEÆ, a tribe of Cryptogamic plants belonging to the natural order of *Algæ*, and to the inarticulate division of that order. Under the article SEA-WEEDS, the most important tribes of the division *Inarticulatæ* of the order *Algæ* are described, with the exception of *Ulvaceæ*, *Siphoneæ*, and *Lemanieæ*.

The *Ulvaceæ* include plants which are found in the sea, in fresh water, or on the damp ground. They are generally of an herbaceous green or fine purple colour, and have a thin, tender, membranaceous, reticulated structure, rarely gelatinous. This tribe contains about ten genera, of which the following are British. *Porphyra*, the Purple Laver, has a plain frond, exceedingly thin, and of a purple colour. Four species of it are enumerated. The most common is the *Porphyra laciniata*, common in the sea from spring to autumn, and growing on rocks and stones. It is gelatinous, and is sometimes eaten. *Ulva*, Green Laver, has several British species, three growing in the sea, one in fresh water, and three in damp places on the land. *U. latissima*, the Broad Green Laver, is an abundant plant on the rocks and stones of the sea in summer and autumn. In common with *U. lactuca*, the Lettuce Green Laver, it is gathered and eaten. *U. bullosa*, the Blistered Green Laver, is the fresh-water species. The terrestrial species of *Ulva* are found growing on walls, rocks, and roofs of thatched houses, and especially in places exposed to much moisture. *U. thermalis* grows in hot springs

at a temperature of 117° Fahrenheit. The genus *Tetraspora* inhabits fresh water, and includes two British species. *Enteromorpha*, the Water-gut, has seven or eight species described as British. They are all inhabitants of the sea, or of pools and ditches of salt water, with the exception of *E. intestinalis*, which is also found in fresh-water pools. *Bangia* was named after Hoffman Bang, a Danish naturalist, who wrote a work on the *Conferveæ*.

ULVERSTONE. [LANCASHIRE.]

ULYSSES, ULYXES, or ULIXES, is the name under which the Greek hero Odysseus (Ὀδυσσεύς) was popularly known among the Romans. Ulysses, who is the hero of Homer's 'Odyssey,' was a son of Laertes and Anticleia, king of Ithaca, husband of Penélope, and father of Telémachus. His story, as related by Homer, has been much extended and modified by later poets and mythographers. In Homer he is represented as the model of a prudent warrior, as a man of great experience and acuteness, always ready to devise means of avoiding or escaping from difficulties, as superior to all men in eloquence and intelligence, in wisdom equal to the gods themselves, and in adversity courageous and undaunted. Later poets, and sometimes the Greek tragedians, depict him in a different light, as cunning, false, and mean. When the Greek chiefs had resolved upon their expedition against Troy, Agamemnon went to Ithaca to invite Ulysses to join them, but it was not without difficulty that he was induced to assist in the enterprise. He joined the other Greek chiefs in the port of Aulis, with twelve ships. During the war against Troy he acted a prominent part, sometimes as a gallant warrior, and sometimes as a bold and cunning spy or emissary. After the destruction of the city his wanderings and sufferings began, which form the interesting story of the 'Odyssey,' from the fifth book included. The story terminates with his return to Ithaca, the destruction of the suitors who had been eating up his substance, and the acknowledgment of their true king by the Ithacan people.

UMBEL, in Botany, a form of inflorescence in which there are several flower-stalks all radiating from a common point, and having an equal length.

UMBELLI'FERÆ (Latin, *umbella*, from *umbra*, 'a shade'), a natural order of plants. Most of the species are herbs, seldom shrubs.

The arrangement of this order has always been a matter of difficulty, arising from the circumstance of the whole family being connected together by so many peculiar characters. The same difficulty arises in the subdivision of other orders, in which the primary characters are well marked, as *Compositæ* and *Gramineæ*.

The genera include above 1000 species. These are principally inhabitants of the northern temperate zone, and the greater number of them are found in the Old World.

The properties are variable, and very important. One of the distinguishing characters is the possession of an acrid principle which finds its full development in such plants as the Hemlock (*Conium*), the Cowbane (*Cicuta*), *Œnanthe*, *Helosciadium*, *Æthusa*, &c. This renders the whole order suspicious.

Another important secretion of the *Umbelliferæ* is a volatile oil, which is found in all the species, with the exception of *Conium*, deposited in the canals of the pericarp, which are called vittæ. In some species it is more abundant than in others; and on this account the fruit, which is commonly called the seeds, is used frequently in diet as a condiment, and in medicine as an aromatic and carminative. Of these the carraway, the anise, the dill, the cumin, and coriander are among those best known.

A third secretion of these plants is a gum-resin. This probably, like the two last secretions, is common to the whole order, but is fully developed in only a few species. The gum-resins produced by this order have had a great reputation in medicine, and many of them are still looked on as valuable remedies. The Laser, or Silphion, of the ancients, is secreted by plants belonging to this order, and Asafœtida, Galbanum, Gum-ammoniacum, Opoponax, and Sagapenum are much used as stimulant medicines in nervous diseases at the present day.

A fourth secretion, which also on account of its occasional excess renders this order important to man, is starch. This secretion, which forms so large a portion of the food of animals, is deposited in largest quantities in the roots of the carrot, the parsnip, and the skirret, and on this account these plants are extensively cultivated. Most of the roots, however, contain this principle, and might be used as articles of diet, but that they also contain the poisonous principle of which we have before spoken. Many of the *Umbelliferæ* are much affected in their secretions by climate and cultivation. Thus the deadly hemlock in Russia is an eatable plant, whilst the celery of our gardens, if grown on the roadside, becomes an active poison.

UMBER, an ore of iron and manganese, employed as a brown pigment. Occurs massive, amorphous. Structure earthy and soft. Falls to pieces in water. Colour blackish, reddish, or yellowish brown. Specific gravity, 2·206. It occurs in beds with brown jasper in the Isle of Cyprus. It is stated to consist of oxide of iron, 48; oxide of manganese, 20; silica, 13; alumina, 5; water, 14.

UMBILI'CAL CORD (Lat. *umbilicus*, 'the navel'), in Anatomy, the navel string, or cord-like intestinal substance that proceeds from the navel of the fœtus to the centre of the placenta. It is about 18 inches long, and is a cellular substance, composed of a cutaneous sheath, two umbilical arteries, and one umbilical vein. The arteries convey the blood from the fœtus to the placenta; and the vein carries it from the placenta to the fœtus. That portion of the abdominal parietes, about 2 inches round the navel, is called the *Umbilical region*.

UMBILI'CUS (Conchology). When the inner sides of the whorls or volutions of a spiral shell do not touch each other, so that its axis is hollow, that hollow is termed the *Umbilicus*.

UMBO (Conchology), the name for that point in a conchifer or bivalve shell which constitutes the nucleus or apex of each valve, and which is generally situated above the hinge, and always near it. From this nucleus or umbo the longitudinal rays of the shell diverge, and the lines of growth, commencing immediately around the nucleus or umbo, increase in gradually enlarging concentric layers to the outer margin of the valve. (See Plates 'Conchology').

UMBRA. This Latin word has been used to signify the shadow of the earth or moon in an eclipse: the term *Penumbra* is still retained to signify that portion of the heavens which is partially shaded.

UMBRELLA (Lat. *umbra*, 'a shade'). As might be expected, umbrellas for the purpose of protecting the head from the sun, are of very remote antiquity. The idea would suggest itself at an early date to nations suffering from the rays of a tropical noonday, and umbrellas, not unlike the gig umbrella of the present time, are actually represented among the wall pictures and

sculptures of Egypt and Nineveh. From the East the useful invention was imported into Greece, and from Greece it was borrowed by the Romans. In Asiatic countries it was, however, one of the insignia of royal power, and Mr. Ferguson suggests that it was thence adopted as the finial termination of the roofs of the pagods or temples. The Buddhist *topes* and Chinese *pagodas* are, in fact, nothing more, in design, than a series of umbrellas raised one above another (*Handbook of Architecture*). On the other hand, it has been suggested that the tent of the nomad was the original type of both.

The umbrella was not introduced into England until the seventeenth century, when the wealthy and luxurious adopted it as a sun-screen. About the reign of Anne it was much used in London as a protection from the rain, but only by women. The first male who boldly ventured into the public streets, umbrella in hand, was the eccentric philanthropist, Jonas Hanway, who suffered from ill health. A torrent of ridicule was directed against him, and he and his machine became the butts of all the wits, but before his death he had the satisfaction of seeing his example very generally followed. In due time the want of an umbrella was considered a sign of carelessness or poverty, and the manufacture of these useful articles is now a flourishing and important trade. How many are made in Great Britain it is impossible to state, but the value of those exported in 1866 was 159,754*l.*, chiefly to India, the United States, and Brazil. The materials used are principally silk, cotton, and alpaca.

The usual processes of the manufacture have thus been described:—'In preparing an ordinary umbrella stick, usually of stained beech, it passes through nineteen different processes or movements. In preparing the ribs, of cane or whalebone, each passes thirteen times through the hand, making 104 times for the eight. In weighing the ribs, to give them all an equal flexure and similar curve, there are eight more transfers from hand to hand. In threading the ribs to the stretchers, the sum total of operations for the entire frame is brought up nearly to 150. All this labour is done for a price so inconceivably small as to be scarcely credible. It varies from one halfpenny to twopence halfpenny for the cheapest kinds of parasols and umbrellas. One man and four lads can put together nearly 100 such frames in a day. The women and girls, who cover the umbrellas and parasols with silk, alpaca, or gingham, receive a penny apiece for the commonest, and thence rise to higher prices for the best.'

The process of putting together the frames with cane and whalebone ribs is chiefly done by small masters in London, who are assisted by boys. The covering is performed by women and girls at their own homes. The frame-maker is supplied with the sticks, ribs, stretchers, and runners, from the warehouse; but he provides the iron wire and the plate-brass, as well as all the working apparatus. The fixing of the handles and ferules is generally done at the warehouse where the umbrellas are sold. But notwithstanding the small cost of all these operations, the London manufacturers are out-cheapened by those of Birmingham, where an umbrella frame, comprising stick, ribs, stretchers, and ferule, can be made and sold for sevenpence.

UMBRELLA-BIRD. [CORACINA.]

UMBRI, OMBRI, or O'MBRICI, were one of the oldest peoples of Italy. They appear to have been living at a very remote period in the highlands of the central Apennines, whence they descended into the valleys of the Tiber and the Nar. They spread also beyond the Apennines, to the coast of the Adriatic. Sarsina, on the river Sapis, and Sentinum, were towns of the Umbri north of the Apennines. They came into collision with the Etruscans, who took many towns from them. They afterwards joined the Etruscans against Rome, and about B.C. 307 they acknowledged Roman supremacy.

Umbria, under the Roman republic, was one of the divisions of Italy proper, extending from Ocriculum on the south to Ariminum and Pisaurum on the Adriatic coast. On the east the river Æsis separated it from the Picenum, and the Nar from the Sabinum. On the south it bordered upon Latium, and on the west upon Etruria. The Rubicon formed its boundary towards Cisalpine Gaul.

UMPIRE. AWARD. The word umpire (from the Lat. *imperium*, 'command') is sometimes used to denote the person who in the first instance decides a controversy; but in its legal sense it means a person named in the submission, or under its authority, by the arbitrators [ARBITRATION] to decide the matters referred, which the arbitrators either cannot or will not decide. The rules which govern an arbitrator also regulate the conduct of the umpire. In Scotland the umpire is usually called *oversman*.

UMRITSER. [AMRITSER.]

UN (Gr. ἀν, Lat. *in*), a particle used in English compound words to signify negation or separation, as '*un*dutiful.'

UNAU, Two-toed Sloth (*Brádypus didáctylus* of Linn.). There are several fossil forms of great interest, closely related to the sloths, particularly to the genera *Megatherium* and *Mylodon*. The Megatherioid Sloths, although as herbivorous as their puny representatives, were from their vast bulk and weight incapable of climbing trees; but they made the tree fall before them. With their powerful claws they laid bare the roots, and then, fixed firmly upon a tripod formed by the hinder limbs and a massive muscular tail, they wrenched the tree to and fro till it bowed its head to the ground; nor is this wonderful, when we reflect upon the extraordinary power of the muscles of these singular animals. We allude, of course, to the living relics of a once numerous group of leaf-eating *Edentata*, which were far more massive than the elephant, and at some remote epoch trod the vasts forests of the New World.

Of the Phyllophagous Edentata we may enumerate the following genera: 1, *Bradypus;* 2, *Cholœpus* (extant); 3, *Megalonyx*, or *Megatherium;* 4, *Mylodon;* 5, *Scelidotherium;* 6, *Cœlodon* (Lund.); 7, *Sphœnodon* (Lund.), all fossil.

UNCA'RIA (Lat. *uncus*, 'a hook'), a genus of climbing plants of the natural family of *Rubiaceæ*, with hooked spines. The species are chiefly natives of India, but a few are found in America. The Gambier Plant, *Uncaria Gambier* of Roxburgh, is a native of Penang, Sumatra, Malacca, &c. The substance called Gambier by the Malays is prepared from this plant, and is known in commerce by the names of Terra Japonica and Catechu.

UNDERGRADUATE, a student of a university or college, who is so called before he has taken his first *gradus*, or degree. [UNIVERSITY.]

UNDERWRITING. [SHIPS, *Maritime Insurance.*]

UNDINE, or ONDINE (from Lat. *unda*, Ital. *onda*, 'a wave'), an elementary spirit, supposed by the Cabalists and the followers of Paracelsus to reside in the waters. So far the idea was simply borrowed from the Naiads of the Greek mythology, but on the ancient fiction the Paracelsists embroidered many fanciful details.

Thus they taught that the Undines could intermarry with men, and that the Undine who became the mother of a human child received with it a human soul. The husband of an Undine was warned never to go abroad on the water with her, or if he did so, to be careful she was not vexed or irritated, as in such a case she immediately returned to her native element; and thenceforth she pursued her husband with changed feelings, even compassing his destruction if he hazarded a second marriage. On this curious myth Baron de la Motte Fouqué founded his beautiful tale of 'Undine.'

A belief in water spirits still prevails in some parts of Germany; and the Saxon peasants assert that an Undine is a frequent visitor to the market-place of Magdeburg. She wears the dress of a peasant girl, but may always be known by having one corner of her apron wet. The superstition was very widely spread in northern Europe, the Scandinavians believing in their Nix, and the Scotch in their Kelpies. The reader will not need to be reminded that the White Lady of Avenel, in Scott's novel of 'The Monastery,' is a water spirit. In the poetry of Germany the 'Lurlie,' or spirit of the Rhine, plays an important part.

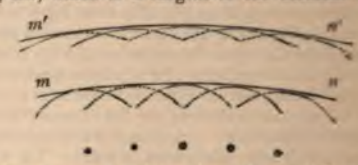
UNDULATORY THEORY OF LIGHT, a theory in which it is attempted to refer the phenomena of light to the supposed vibrations of an ethereal medium. Descartes is considered as the first who entertained the opinion that vision might be so explained; but Huyghens ('Tractatus de Lumine') both advanced the undulatory hypothesis and explained by it the principal circumstances relating to the reflection and refraction of light. The hypothesis has since been adopted by many distinguished mathematicians, both in this country and on the Continent.

A straight line, which, proceeding from a radiant point, would in the theory of emission be called the direction of a ray of light, is, in the undulatory theory, considered as the direction of a wave's motion; and vibrations, very short in extent, of the ethereal particles in any direction about their mean places in such line, but always in planes perpendicular to the direction of the wave's motion, constitute common light. The interval, in that direction, between two nearest points at which particles, setting out at the same instant from those points, return to the same points after having performed an entire vibration, is called the length, l, of a wave: and if t represent the time in which a particle makes a complete vibration, $\frac{l}{t}$ will denote the velocity of a wave of light, or the velocity of light. No perception of light is supposed to be produced by any vibrations which the particles of ether may make in the direction of the wave's motion. The intensity of light on a screen, or in the eye, is supposed to depend on the greatest extent of the transverse vibrations of the particles when they touch the screen or the retina of the eye; and is represented by the square of that greatest extent of vibration. Plane polarized light is that in which the vibrations of the ethereal particles (still taking place in planes perpendicular to the direction of the wave's motion) are performed, some in lines parallel to one another and to one plane passing through the direction of the wave's motion, and others in lines parallel to one another and to a plane passing through that direction, but perpendicular to the former plane. Thus, if the direction of the wave's motion be perpendicular to this paper, the vibrations both of common and polarized light are performed in planes parallel to the paper; and if the particles vibrate in directions parallel to any line in the paper, the light is said to be polarized in a plane passing through a line in the paper at right angles to that line.

The motions of the ethereal waves in lines radiating from a luminous point being supposed equal, the particles which are in the surface of an imaginary sphere having the luminous point for its centre will be in like positions, or like states of condensation, with respect to those which are within and beyond that surface. As the impulse communicated to the luminous particles continues, the radii of the spherical surfaces (the surfaces of the waves) increase in length, so that if the origin of the light is at a celestial body the surface of the wave at the earth may be considered as a plane.

If we suppose the elasticity of the medium through which the vibrations are transmitted to vary by insensible gradations, the figure will be flattened towards that part where the elasticity is less. If A B, in fig. 1 (see Plate prefixed to this volume), be the earth's surface, C D, E F, G H, &c., the atmospheric strata, and s a luminous point, the waves will be less curved as they approach the perpendicular, s B, and the line s, 1, 2, 3, 4, 5, &c., will appear to be continually bent towards the earth.

When the waves from a luminous point arrive at or near any surface which may arrest or change the rate of their progress, every point in such surface is conceived to become the centre whence, as if it were a new luminous point, proceeds another series of concentric spherical waves, the length, l, remaining the same as before if the ethereal medium is the same. The waves thus proceeding from the different points of an object by which the original wave was arrested interfere with one another, but a plane or curved surface, as $m\ n$, $m'\ n'$, &c., which is a tangent to the surfaces of the



secondary waves at points where the particles are in like states, or phases, is to be considered as the front of a wave.

The secondary waves thus arising may be either reflected back from the surface of the medium on which the original wave is incident, or they may be transmitted through that medium. In the latter case they are supposed to be produced either by vibrations immediately communicated to the ethereal matter within the medium, or to this matter through vibrations excited in the particles of the medium itself; but the velocity of the transmitted waves is supposed to be different from that of the incident waves when the density or elasticity of the refracting medium differs from that in which the rays moved previously to their incidence.

The number of vibrations to or fro which an ethereal particle makes in a given time is supposed to determine the colours of natural bodies; but the velocity is constant, since it depends on the homogeneity and uniform elasticity of the ethereal medium: therefore the values of l and t differ for different colours. The values which cause the perception of redness are the greatest, and those which produce the violet colour are the least.

In order to explain the manner in which reflection

takes place at a plane surface, on the undulatory hypothesis, let the direction of a wave's motion be oblique to the reflecting surface, so that the plane forming the front of the incident wave may meet that surface obliquely. Then the points at which the particles are successively arrested become the centres of spherical waves diverging thence; and these waves moving with the original velocity, form a plane touching all their spherical surfaces, which becomes the front of the reflected wave, and makes an angle with the reflecting surface equal to that which is made by the incident wave, but in an opposite direction with respect to a perpendicular drawn from that surface. Consequently the directions of the motions of the incident and reflected waves, which are lines perpendicular to their fronts, make equal angles with the reflecting surface.

The manner in which ordinary refraction at a plane surface takes place on the undulatory hypothesis may be thus explained. Let the plane front of a wave meet the refracting surface obliquely; then the points in which the particles successively arrive there become by the interruption the centres of spherical waves whose particular fronts advance in the refracting medium with velocities equal to one another, but different from that of the incident waves: consequently, a plane touching the fronts of all the refracted waves will make with the refracting surface an angle whose sine is, to that of the angle made by the front of the incident wave with the same surface, in a constant ratio, which is that of the velocities of the waves after and before refraction. Thus, in the same medium, the sine of the angle of incidence is, to that of the angle of refraction, in a constant ratio. This is sufficiently demonstrated in fig. 2. Let A B be a plane surface separating two media, and S the luminous point propagating a series of spherical waves, of which let A a be one. Suppose this wave A a next to move forward into the position B b. Extend b B through D, and in A B, from a point, X, describe the hemisphere surface, X c, and regard X as a centre of vibration. To an eye placed at X, the luminous point, S, will appear in the direction S X, perpendicular to the incident wave; and the eye placed in C will perceive the reflected image of S at s, in the direction c s, perpendicular to the reflected wave; but c s passes through X, because the spheres C c and B b touch at c: therefore the way by which s is seen at C passes through X. But the surfaces B D, B d being similar and equal, the angle B X c = B X C = A X S.

If the reflecting surface be not a plane, the reflected wave will not be spherical. Its form, however, may be determined by fig. 3. Take any point X in the reflecting surface, and describe the sphere X 2, and with the centre X and radius equal to B 2 describe another sphere. Do this for every point in the surface A B, and the surface which is a common tangent (as B c d) to all these spheres is the surface of the reflected wave.

In order that the relation between the sines of incidence and refraction may be conformable to the results of experiment, it is necessary to assume that the velocity of the waves is diminished when they enter a medium more dense than that in which they previously moved; and in this circumstance the undulatory theory is opposed to the theory of emission: for in the latter the velocity of light is supposed to be increased when it passes from any medium into one more dense.

To demonstrate the law of refraction in the undulatory system, let S, fig. 4, be a luminous point from which waves of light are emitted to Y, X, B. These points immediately become centres of undulation propagated by a different velocity, by reason of the difference of elasticity in the medium. Let V : v : : velocity in the first medium to that in the second; describe the sphere B Q R, take X $c = \frac{v}{V}$, Q, X, and Y $c = \frac{v}{V}$. Y R then will represent X c, and Y e the spaces traversed by the refracted secondary waves propagated from X and Y respectively, when the direct wave has reached B. About X and Y, as centres with those radii, describe spheres, and let c e be points in the curve surface, which is a tangent to all such spheres; X c and e will be perpendicular to this surface, and also the directions of the refracted rays at X and Y.

When several undulations coexist, they are said to interfere with one another; and assuming that the displacement of a particle produced by any number of coexisting undulations may be expressed by the sum of the displacements which the undulations would separately produce, the rules of integration will give the whole amount of the disturbance produced by the interference of any number of waves. When, for example, two waves are equal in length, the greatest amplitudes of vibration may occur at places which are at intervals from one another equal to l, $2l$, $3l$, &c.; and if the amplitudes are equal, the whole amplitude of vibration will be double that of one particle alone: thus on a screen the light produced by the two undulations will be twice as great as that which would be produced by one. On the other hand, if two equal undulations are transmitted in the same direction, and the one follows the other at an interval equal to $\frac{1}{2}l$, $\frac{3}{2}l$, $\frac{5}{2}l$, the maximum of amplitude in one will coincide with the minimum in the other, and the effects will be destroyed, or the particles will be at rest, and on a screen darkness will be the result. If the undulations follow at other distances, the destruction of the vibrations will be incomplete, and on the screen the brightness will have some intermediate degree of intensity.

In fig. 5 let the surface A B C of a wave of light consist of vibratory molecules, all in the same phase of their vibrations; and let it be divided into an infinite number of elementary portions, such that the difference of distance of each consecutive pair from X shall be constant: and let A B, B C, C D, &c., and A b, b c, c d, &c., be finite portions of the surface, containing each the same number of the elements, and each of which is exactly equivalent to half an undulation greater than the preceding. Then it is evident that the vibrations which reach X simultaneously from the corresponding portions of any two consecutives ones, as of A B and B C, will be in exactly opposite phases; and therefore, were they of equal intensity, and in precisely the same direction, would interfere with and destroy each other.

By this theory Newton explained the formation of those beautiful rings of colour seen in soap-bubbles, in the cracks of broken glass, the laminæ of Iceland spar, mica, &c. The unequal breadth of these rings may be accounted for as follows:—Let A E, fig. 6, be the diameter of a convex spherical surface A D; then E A : A D : : A D : D B = $\frac{\text{A D}^2}{\text{E A}} = \frac{\text{D}^2}{8}v$; and, in like manner, B C = $\frac{\text{D}^2}{8}v^1$, so that $\frac{1}{8}$ D^2 ($v - v^1$) = D C, the interval of the surface at the point D. To see these rings at extreme obliquities, a prism may be used, laid on a convex lens, as in fig. 7. If the eye be placed at K, the set of rings formed about the point of contact at E will be

seen in the direction K H, but as the eye is depressed at I the rings are seen to dilate. Sir William Herschel employed the following method to observe the colours reflected by a plate of air at great obliquities:—On a perfectly plane glass he laid an equilateral prism, with a truly plane base, and looking in at the side A C, fig. 8, the reflected prismatic iris *a b c* were seen in the direction E F, where a ray from E would be totally reflected. Within this iris, and arranged parallel to it, are seen a number of beautiful coloured fringes, whose number and distances from each other vary with every change of the pressure. The magnitude of the rings varies also according to the kind of light. This may be regarded as an analysis of what takes place when the rings are seen in ordinary white light, and may be understood by reference to fig. 9. Where the abscissæ or horizontal lines represented the thicknesses of a plate of air between two glasses, R R′ R R″ &c., represent the several thicknesses at which the red in the system of rings illuminated by red light only vanishes; while R *r*, R *r*′ R *r*″ &c., represent those at which the brightness is a maximum. Let *G*′ *G*″, &c., represent, in like manner, the orange, and so on, for yellow, green, blue, indigo, and violet. Then if we describe a set of undulatory curves, and at any point, as at C in A E, draw a line parallel to A E, cutting all these curves; their several ordinates, or the portions of this line intercepted between the curves and their abscissæ, will represent the intensity of the light of each colour sent to the eye by that thickness of the plate of air.

Newton also applied this principle to the passage of rays near the edge of an opaque body. He conceived that by alternate fits of easy attraction and repulsion in the particles of light the rays might assume a serpentine form; and that from corresponding points in the flexures they might send off particles in lines which, crossing one another, would form series of points where the light would be more condensed than in the intermediate spaces. The order and magnitudes of the bands or fringes thus produced on a screen have to a certain extent been explained by Newton's hypothesis, but the theory of the interference of waves will account completely for the phenomena.

It was objected by Newton to the undulatory theory that, if just, light passing by the edges of an opaque body ought to be inflected into the shadow cast by the body, as waves of air and water flow round any obstacle which may be in the direction of their motion. This difficulty has not wholly been removed; but it is well known that such inflections do really take place to a certain extent, and the circumstances attending them have been fully explained by the theory. Dr. Young allowed a diverging pencil of light to pass into a dark room through a very small orifice, and having placed in the pencil a narrow and opaque body with parallel sides, he observed that the shadow which the body cast on a screen was divided by parallel coloured bands alternately dark and bright, the band in the middle being always bright. In order to account for this appearance on the undulatory hypothesis, it is only necessary to observe, that the paths of the waves of light from the edges of the body to a point on the screen opposite its centre being equal to one another, the fronts of the interfering waves must arrive at that centre in the same state; and their effects being added together, there must result a maximum of brightness; but the paths of the waves from the edges of the body to any other part of the shadow on the screen will be unequal; and at every place where the difference is exactly an uneven multiple of $\frac{1}{2}l$, the waves must arrive in opposite phases, and thus destroy each other's effects, or produce darkness. Between these dark bands the degrees of brightness will depend upon the states of the interfering waves at those places. If the incident light is homogeneous, or of one colour, all the bright bands are of that colour, and the intervals between them are black.

If the orifice is a narrow slit with parallel sides, the image on the screen will be a series of parallel bands alternately dark and bright, and symmetrically disposed on each side of a bright band in the centre. If the orifice is circular, the central image is either a bright or a dark spot, according to the distance of the screen; and about it are concentric coloured rings.

The breadths of the bands, and the diameters of the concentric circles of light and darkness, are found to depend on the breadth or diameter of the aperture, and not on the nature of the material by which the diffraction is produced; and Dr. Young considers this circumstance as a strong argument against the opinion that the phenomena are the results of attractive and repulsive forces exercised by the edges of the material on the particles of light. But, at the same time, it may be observed that some discrepancies between the results of the undulatory theory and the phenomena of diffraction within the shadows of small circular discs have been pointed out by Professor Potter, of University College, London.

From the breadths of the bands produced by the diffraction of light are obtained the lengths of the waves of different colours. This length, for the extreme red colour, has been found to be 0·0000266 inch, and for the extreme violet colour 0·0000167 inch. The length of a wave for each colour is very nearly four times the length of a fit of easy reflection or easy refraction in the corpuscular hypothesis.

In the wave theory it is assumed that common white light is caused by the combined undulations of the ethereal medium, when waves of different lengths are mixed together; and the most serious difficulty to which that theory is subject lies in the imperfect explanation which it affords of the unequal refrangibilities of different colours. Professor Airy suggests that the development of the action caused by the particles of a refracting medium may depend on time, and on that account it may give rise to unequal refrangibilities by producing differences in the velocities with which waves are transmitted through the medium. (*Mathematical Tracts*, pp. 285–6, note.) [DIFFRACTION; POLARIZATION OF LIGHT; CIRCULAR and ELLIPTICAL POLARIZATION.]

UNFUNDED DEBT is a part of the national debt of the United Kingdom which consists of money raised by granting annuities for life, or a term of years, and by exchequer bills, which are renewed from time to time. [EXCHEQUER BILLS.] In 1867 the amount of the funded debt was 792,892,047*l.*, and of the unfunded, 7,956,800*l.* The interest paid upon the latter sum in the same year was 287,123*l.*

UNGUENTS, or Ointments, are unctuous substances for external application, and intended to answer a variety of purposes, according to their composition. The chief use of ointments is either by their emollient qualities to soften tense or hardened parts, or to sheath excoriated parts from acrid secretions or the irritation of the air.

UNGUIS, in Botany, the narrow part or 'claw' (Lat. *unguis*) of the base of a petal, usurping the place, and, in fact, being a modification of the foot-stalk of a leaf. *Unguis* is also used as a term of measure, equal to half an inch, or the length of the nail of the little finger.

UNGULATA (Lat. *ungula*, 'a hoof'), *Hoofed Mammalia*. Under this section Linnæus included the orders *Bellua* and *Pecora*. The *Bellua* comprised the genera *Equus*, *Hippopotamus*, *Sus*, and *Rhinoceros*; the *Pecora* consisted of the genera *Camelus*, *Moschus*, *Cervus*, *Capra*, *Ovis*, and *Bos*. According to Professor Owen's scheme of classification, the group *Ungulata* includes four orders, namely, *Toxodontia*, a fossil order bearing some resemblance to the elephant; *Proboscidea*, which includes the fossil genus *Dinotherium*, and the recent one, *Elephas*; *Perissodactyla*, or Hares, &c.; and *Artiodactyla*, or Ruminants, &c.

UNICORN (Lat. *unus*, 'one,' and *cornu*, 'a horn;' Heb. *rêêm*). 1. An animal referred to about ten times in the Bible. 'The Hebrew term *rêêm*,' says Dr. Duns ('Biblical Natural Science,' vol. ii.), 'is singular, and should not, as in Deut. xxix., have had a plural signification assigned to it. This has been done in the belief that the unicorn of Scripture is identical with the rhinoceros, the only species of which, at the time when our translation was made, that was well known, was the Indian rhinoceros (*Rhinoceros Indicus*), formerly termed the unicorn rhinoceros (*R. unicornis*). But while there are only two species which have one horn, there are five bi-horned species. If it could be determined that the Hebrew *rêêm* is always used in the definite sense of species, we would have to render it by one English equivalent. But this cannot be done. Indeed, the modern Arabs employ a corresponding word to include wild goats, deer, cattle, and the rhinoceros also. It is in the highest degree probable that the word was originally used in this general way by the writers of Scripture likewise. It is suggestive to find that the ancient writers of the West held views as general as those of the East, when referring to certain animals, for which modern authors have claimed the honour of representing the famed unicorn. For example, Pliny mentions "Indian oxen with undivided hoofs and a single horn" (Nat. Hist. viii. 21). Aristotle speaks of "a few solid-hoofed animals with one horn, such as the Indian ass and the oryx" (H. A. ii. 2).

'The literature which has gathered around the question, What was the unicorn? would fill several large volumes. I know above twenty monographs on the subject. These may be summed up thus:—

UNICORN = { Fabulous animal, used as an emblem. / The Oryx. / The Rhinoceros. / The Buffalo.

'Bochart pleads for the oryx, Bruce for the rhinoceros, and the majority of modern interpreters for the buffalo. The word is derived from a root which signifies height. It seems to have been applied to an animal specially suggestive of majesty. An examination of the passages in which the *rêêm* is named, seems to me to warrant the inference, that in the Pentateuch and in Job the rhinoceros is pointed to, while in the later writers, David and Isaiah, the buffalo is the animal alluded to.'

2. The name of a fabulous animal used in heraldry. In the royal arms of Britain it is introduced as a supporter, *salient*, having the head, neck, and body of the horse, the legs of the stag, the tail of the lion, and a long twisted horn on the forehead. This heraldic figure may be traced to the accounts of a fabulous animal given by some ancient writers. 'The *Onoi agrioi*,' says Ctesias (B.C. 400), 'are as large as horses, and even larger, with white bodies, red heads, blue eyes, and have each on their foreheads a horn a cubit and a half long, the base of which is white, the upper part red, the middle part black. Drinking-cups are formed of these horns; and those who drink out of them are said to be subject neither to spasm nor epilepsy, nor to the effects of poison.' Pliny (A.D. 70) has the same animal in view when he says—'The Orsæan Indians hunt a very fierce animal, called the monoceros, which has the body of a horse, the head of a stag, the feet of an elephant, and the tail of a wild boar; it utters a deep lowing noise, and has a single horn, two cubits long, projecting from the middle of its forehead.' 'The monoceros,' says Ælian (130), 'is as big as a full-grown horse, with a mane and yellow woolly hair, of greatest swiftness, with feet like the elephant, and the tail of a wild boar. It has a black horn growing between the eyebrows, which is not smooth, but with natural twistings, and is very sharp at the point. It utters loud harsh sounds. It lives peaceably with other animals, but quarrels with those of its own kind—the males even destroying the females, excepting at breeding-time, at which season the animals are gregarious; but at other times they live in solitude in wild regions.'

3. The Sea Unicorn, or Narwhal (*Monodon monoceros*), one of the *Delphinidæ*, or Dolphins, in which the male is furnished with a horn of great length, projecting from the centre of the upper jaw, in the form of a straight pole of ivory.

UNIFORMITY, ACTS OF. Parliament has never attempted to coerce lawyers into agreement of opinion, or doctors into using one method for the treatment of disease. It has, however, made repeated attempts to enforce uniformity of religion. Its records contain a considerable number of Acts of Uniformity. The first of these was passed in the second year of the reign of Edward VI. The 1 Ed. VI. c. 1 states, that 'of long time there have been divers forms of common prayer, commonly called the service of the church, that is to say, the use of Sarum, of York, of Bangor, and of Lincoln; and besides the same, now of late much more divers and sundry forms and fashions have been used in the cathedral and parish churches, as well concerning the mattins and the even song, as concerning the Holy Communion, with divers and sundry rites and ceremonies.' It proceeds to pronounce a commendation upon the king for his great goodness in having 'borne with the frailty and weakness of his subjects in that behalf,' and for 'abstaining from punishment of those that have offended.' And, 'to the intent that a uniform, quiet, and godly order should be had, the king appointed Cranmer, archbishop of Canterbury, with other bishops and learned men (having as well eye and respect to the Scripture as to the usages in the primitive church) who, together, shall make one convenient and meet order of common and open prayer; the which, at this time, by the aid of the Holy Ghost, with one uniform agreement is of them concluded.' This book was to be used in all churches and chapels. Whosoever had before offended was to be pardoned, except such as were in prison in the Tower and in the Fleet. 'None other book' was to be used. Any minister who disobeyed the Act was to be deprived of his living or imprisoned for life.

The book which was thus to secure 'one uniform agreement' having failed to do so, was called in by authority of the 5 & 6 Ed. VI. c. 1, 'because there hath arisen, in the use of the aforesaid common service, divers doubts, rather by the curiosity of the ministers and mistakes than of any worthy cause.' The same session of Parliament in which the corrected Book of Common Prayer received the sanction of law, had to pass an Act

against 'fighters and frayers in churches and churchyards,' who resisted by violence the first attempt of the state to compel uniformity. The 5 & 6 Ed. VI. c. 4 (now for the most part repealed), provides that whoever was found guilty of quarrelling, chiding, or brawling, in any churchyard, the bishop was to punish in the way therein stated. If the person struck a blow, 'or drew any weapon with the intent to strike,' one of his ears was to be cut off; and if the offender 'have none ears,' then 'he or they shall be burned and marked in the cheek with an hot iron.' Another Act of Uniformity changed the whole state of things. Queen Mary's Parliament swept away all the Acts of Edward relating to bishops and the liturgy. By the 1 Mary, c. 2, it was provided that 'all such divine service and administration of sacraments as were most commonly used in England in the last year of Henry VIII., shall be used through the realm after the 20th December, 1553.'

In five years and a half (1558) Elizabeth required the restoration of Protestant uniformity. The 1 Eliz. c. 2, made void the repealing statute of Mary because it occasioned 'the great decay of the due honour of God, and discomfort to the professors of the truth of Christ's religion.' The reigns of Edward, Mary, and Elizabeth, contain many statutes of pains and penalties to coerce the clergy into external oneness, to which we need not refer. (Muscutt on the *Church Laws.*)

During the rebellion the laws against Protestants, whereby they were prohibited from writing, preaching, or printing anything against the then established religion, under heavy penalties, were repealed. At the restoration they revived, and were systematically and rigorously enforced. The 13 Car. II. s. 2, c. 1, commonly called the Corporation Act (since repealed), provided that no person should thereafter be elected to office in any corporate town, who should not within one year previously have taken the sacrament of the Lord's Supper, according to the rites of the Church of England; and every person so elected was also required to take—in addition to a certain oath and declaration afterwards repealed by the 5 Geo. I. c. 6, s. 2—the oaths of allegiance and supremacy. This was followed by the 13 & 14 Car. II. c. 4, which, to distinguish it from the less effectual enactments which have been made with the same object, is commonly emphasized as *The Act of Uniformity*. It was introduced under the following circumstances:—A royal commission, composed of Episcopal and Presbyterian divines, appointed in 1661 to consider what alterations could be made in the Book of Common Prayer to meet the objections of the nonconformists, who had endeavoured to induce the king not to revive its use, having held a conference which ended without any agreement being arrived at, the king directed the convocation to proceed at once with the revision of the liturgy. The two Houses of Convocation worked with great zeal and despatch, and the result of their labours having received the approval of the king and privy council (February 24, 1662), they were transmitted to the House of Lords, who minutely discussed the alterations and amendments, and after giving them their sanction sent the revised book to the House of Commons. The Commons being well pleased with it, determined that it should be used by the entire country. To give effect to this their determination they introduced the Act of Uniformity. It passed both houses on the 9th July, 1662, and is the 13 & 14 Car. II. c. 4, above referred to. It recites that 'in the first year of the late Queen Elizabeth there was one uniform order of common service and prayer, and of the administrations of sacraments, rites, and ceremonies in the Church of England;' that 'the mercy, favour, and blessing of Almighty God is in no wise so readily and plentifully procured as by common prayers, due using of the sacraments, and often preaching of the gospel, with devotion of the hearers; and yet, this notwithstanding, a great number of people in divers parts of this realm, following their own sensuality, and living without knowledge and due fear of God, do wilfully and schismatically abstain and refuse to come to their parish churches and other public places where common prayer, administration of the sacraments, and preaching of the word of God is used upon the Sunday, and other days ordained and appointed to be kept and observed as holy days: and whereas by the great and scandalous neglect of ministers,' in not using the order or liturgy referred to in the statute, 'great mischiefs and inconveniences during the times of the late unhappy troubles have arisen and grown, and many people have been led into factions and schisms, to the great decay and scandal of the reformed religion of the Church of England, and to the hazard of many souls; for the prevention whereof in time to come, for settling the peace of the church, and for allaying the present distempers which the indisposition of the time hath contracted, the King's Majesty, according to his declaration of the five and twentieth of October, one thousand six hundred and sixty, granted his commission under the great seal of England to several bishops and other divines to review the Book of Common Prayer, and to prepare such alterations and additions as they thought fit to offer: And afterwards the convocation of both the provinces of Canterbury and York, being by his Majesty called and assembled, and now sitting, his Majesty hath been pleased to authorize and require the presidents of the said convocations, and other the bishops and clergy of the same, to review the said Book of Common Prayer, and the book of the form and manner of the making and consecrating of bishops, priests, and deacons; and that after mature consideration they should make such additions and alterations in the said books respectively, as to them should seem meet and convenient, and should exhibit and present the same to his Majesty in writing, for his further allowance or confirmation; since which time, upon full and mature deliberation, they, the said presidents, bishops, and clergy of both provinces, have accordingly reviewed the said books, and have made some alterations which they think fit to be inserted to the same; and some additional prayers to the said Book of Common Prayer, to be used upon proper and emergent occasions; and have exhibited and presented the same unto his Majesty in writing in one book, intituled *The Book of Common Prayer, and Administration of the Sacraments, and other rites and ceremonies of the church, according to the use of the Church of England, together with the Psalter, or Psalms of David, pointed as they are to be said or sung in churches; and the form and manner of making, ordaining, and consecrating of bishops, priests, and deacons:* All which his Majesty having duly considered, hath fully approved and allowed the same, and recommended to this present Parliament, that the said Book of Common Prayer, and of the form of ordination and consecration of bishops, priests, and deacons, with the alteration and additions which have been so made and presented to his Majesty by the said convocations, be the book which shall be appointed to be used by all that officiate in all cathedral and college churches and chapels, and in all chapels of colleges and halls in both the universities and colleges of Eaton and Winchester,

and in all parish churches and chapels within the kingdom of England, dominion of Wales, and town of Berwick-upon-Tweed, and by all that make or consecrate bishops, priests, or deacons, in any of the said places, under such sanctions and penalties as the Houses of Parliament shall think fit.'

The second section of the Act thus lays down the *Rule of Conformity*:—'Now in regard that nothing conduceth more to the settling of the peace of this nation (which is desired of all good men), nor to the honour of our religion, and the propagation thereof, than *an universal agreement* in the public worship of Almighty God; and to the intent that every person within this realm may certainly *know the rule* to which he is to conform in public worship, and administration of sacraments, and other rites and ceremonies of the Church of England, and the manner how, and by whom, bishops, priests, and deacons, are and ought to be made, ordained, and consecrated; be it enacted that all and singular ministers in any cathedral, collegiate, or parish church or chapel, or other place of public worship within this realm, shall be bound to say and use the morning prayer, evening prayer, celebration, and administration of both the sacraments, and all other the public and common prayer in such order and form as is mentioned in the said book annexed and joined to this present Act, and intituled the Book of Common Prayer, &c.'

The third section enacts 'that every parson, vicar, or other minister whatsoever,' shall on some Lord's day before the feast of St. Bartholomew, 1662, 'openly, publicly, and solemnly, read the morning and evening prayer appointed to be read by, and according to the said Book of Common Prayer, at the times thereby appointed; and after such reading thereof shall openly and publicly before the congregation there assembled declare his unfeigned assent and consent to the use of all things in the said book, contained and prescribed,' and shall do so in the form given in the Act.

By the fifth section, every person neglecting to comply with the Act within the time stated (unless excused by the ordinary of the place), is *ipso facto* 'deprived of all his spiritual promotions;' and it is provided that 'from thenceforth it shall be lawful to and for all patrons and donors of all and singular the said spiritual promotions, or of any of them, according to their respective rights and titles, to present or collate to the same, as though the person or persons so offending or neglecting were dead.'

The sixth section makes it incumbent on every person promoted to any ecclesiastical benefice to read first, 'in the church, chapel, or place of public worship belonging to his said benefice or promotion,' the common prayer, 'openly, publicly, and solemnly;' 'and before the congregation there assembled declare his unfeigned assent and consent to the use of all things therein contained.'

The seventh section provides that 'in all places where the proper incumbent of any parsonage or vicarage, or benefice, with cure, doth reside on his living and keep a curate,' such incumbent must himself read the common prayers once in every month.

The seventeenth section forbids the use of any other form of common prayer 'in any church, chapel, or other public place of, or in, any college, or hall, in either of the universities, or the colleges of Westminster, Winchester, and Eaton.'

The nineteenth section enacts 'that no person shall be or be received as a lecturer, or permitted, suffered, or allowed to preach as a lecturer, or to preach or to read any sermon or lecture in any church, chapel, or other place of public worship,' unless he be 'first approved, and thereunto licensed by the archbishop of the province, or bishop of the diocese, &c.,' and that he shall, in the presence of the archbishop, or bishop, or guardian, as the case may be, read the Thirty-nine Articles (*q.v.*), 'with declaration of his unfeigned assent to the same.'

The twenty-first section contains penalties for persons who by the Act are 'disabled to preach any lecture or sermon.' They are for every offence to 'suffer three months' imprisonment in the common gaol without bail or mainprize,' &c.

The twenty-fourth section confirms previous Acts of Uniformity thus:—'The several good laws and statutes of this realm, which have been formerly made, and are now in force for the uniformity of prayer and administration of the sacraments within this realm, shall stand in full force and strength, to all intents and purposes whatsoever, for the establishing and confirming of the said book, intituled the Book of Common Prayer, &c., hereinbefore mentioned to be joined and annexed to this Act; and shall be applied, practised, and put in use for the punishing of all offences contrary to the said laws, with relation to the book aforesaid and no other.'

The Act also contained some provisions requiring tutors and schoolmasters, before exercising their profession, to obtain a license from a bishop, and to subscribe to the declaration. These clauses have, however, been repealed: and by the Toleration Act (1 Will. and Mary, c. 18), all persons dissenting from the Church of England (except papists and persons denying the Trinity) were relieved, on certain conditions, from the operation of that portion of the Act which prohibited their assembling for religious worship according to their own forms. Those conditions having been rendered unnecessary by subsequent legislation, and the 10 Geo. IV. c. 7, and later enactments, having restored the Catholics, &c., to their full rights, there is now no longer any legal impediment to the religious meetings of any class of Englishmen.

The passing of the Act of Uniformity caused 2000 clergymen of the Church of England to secede. They sacrificed their emoluments entirely, and joined the ranks of the Presbyterians and Independents.

UNIGENITUS, BULL OF, a celebrated constitution promulgated by Pope Clement XI., in 1713, in condemnation of the so-called heretical tenets of Jansenism, as set forth in the 'Réflexions Morales sur le Nouveau Testament,' by Père Quesnel. The bull obtained its distinctive appellation from its first word, 'unigenitus.' It was procured through the influence of Letellier and the Jesuits, and formally condemned, 'in a lump,' as 'false,' 'scandalous,' and 'offensive,' 101 propositions selected from Quesnel's work. A large party in the French Church, headed by Cardinal de Noailles, archbishop of Paris, refused to accept it, and appealed against the pope to a general council. This opposition was continued with more or less good fortune until 1730, when the bull was registered by the Parliament of Paris, and De Noailles himself was constrained to submit. Since that event, the Jansenists have ceased to exist as an independent party.

UNION FLAG is one of the three ensigns or standards, in which the crosses of St. George, St. Andrew, and St. Patrick are blended, to denote the union of the three kingdoms of England, Scotland, and Ireland. This flag is appropriated to the admiral of the fleet, who is the first naval officer under the lord high admiral.

UNION, LEGISLATIVE, the union of Great Britain and Ireland in 1800.

UNION, THE ACT OF, is the Act by which Scot-

land was united to England, or by which the two kingdoms were incorporated into one, in 1707.

UNIONA'CEA (Lat. *unio*, 'a pearl'), a tribe of bivalved Mollusca, belonging to the order *Asiphonata*, of which the *Unio*, or River Mussel, is the type. They are all inhabitants of fresh water; and several species of the tribe are found in this country; one of the commonest of which is the *Unio pictorum*, so called from the shell having been much used by painters for holding their colours. The whole tribe may be described as having equivalve shells, lined with pearly matter, and covered with a smooth epidermis; the adductor muscles being two in number, and the foot very large. All the different species furnish pearls of an inferior quality, the American species being very numerous; but the *Unio margaritiferus* (Pearl Mussel), which is an inhabitant of the mountain streams of this country, is so called on account of the pearls it contains. [NAIADES.]

UNIONS, TRADES. [TRADE SOCIETIES.]

U'NISON (Lat. *unus*, 'one,' and *sonus*, 'a sound'), in Music, is a sound which is exactly the same as another in regard to pitch.

UNIT or UNITY, the name given to that magnitude which is to be considered or reckoned as one, when other magnitudes of the same kind are to be measured. It is not itself *one*, but is the magnitude which *one* or 1 shall stand for in calculation: it is a length, or a weight, or a time, as the case may be, while 1 is only a numerical symbol. This symbol 1 represents the abstract conception of singleness, as distinguished from multitude, and is the unit of abstract arithmetic; but all concrete quantities must have units of their own kind.

UNIT, an electrical measure, or standard of resistance, employed to compare the resistance of one wire with another. Various *units* of resistance are in use. The unit most generally adopted in this country is that determined by a committee of the British Association, called the B. A. unit, or *Ohm* (from Ohm, who first investigated the laws of electrical resistance).

The value of the Ohm unit is $\frac{1}{25}$, or ·04 of the Wheatstone unit, representing the resistance of 1 mile of No. 16 copper wire, and ·956 of the Siemens' unit, to which it is almost equivalent.

The 'Ohm' gives the following resistance of the ordinary iron wire employed for telegraphs:—

No. 4	equivalent	to	7·8	Ohms	per mile,
" 8	"	"	13·5	"	"
"11	"	"	23·0	"	"

while homogeneous 'metal and steel' are found to have a higher resistance. No fixed unit of *capacity* has yet been determined for submarine cables; it is usual to construct a standard for each special case. This unit is generally in the form of a condenser, adjusted by trial to take the same charge as a mile of the cable; and each mile is tested to ascertain if its capacity agrees with that of the condenser.

UNIT JAR. An apparatus contrived by Sir William Harris for accurately measuring the accumulation or charge of statical electricity. It consists of a small Leyden jar, exposing about 6 square inches of coated surface, inverted on a brass rod fixed to the prime conductor of the machine, or otherwise supported on a separate insulation. The jar, or battery, to be charged is placed in connection with the outer surface of the unit jar. By this arrangement electricity is continually supplied to the jar, and the amount of accumulation that passes is accurately measured by the number of charges which the unit jar has received; the charges being determined by means of two discharging balls, the one in connection with the interior, and the other with the exterior coating. By increasing or diminishing the distance between the discharging balls, the value of the unit may be varied at pleasure; and if the distance between the points of discharge be carefully measured by means of a micrometer screw and index, comparative quantities of statical electricity may be accurately estimated, and restored from time to time.

UNITARIAN. This word, in its strict and literal interpretation, denotes simply a believer in one God; and, when thus understood, is a generic term, applicable to all Christians, for they all profess to receive the unity of the divine nature; and not only to them, but to Jews and Mohammedans also, and even to those persons commonly called Deists, who, on the grounds supplied by natural reason alone, admit the existence, providence, and moral government of one Supreme Being. But it is more commonly understood as opposed to Trinitarian, and is accordingly the received denomination of those Christians who acknowledge one God in one person, as distinguished from those who conceive of him in three persons, characters, or relations, each of which they regard as the proper object of a distinct and separate religious worship. The Unitarian Christian believes the Father to be the only true God, and Jesus his messenger to be the Christ (John xvii. 3). This is the leading fundamental principle, which constitutes the true and complete definition of the term; under which are consequently included all those who, receiving the divine authority or commission of Jesus Christ, believe him to be a dependent creature, deriving his existence from the Father, and therefore as the fit object of all the veneration, submission, and obedience which can be offered to a creature, but not of religious worship properly so called. Agreeing in this great and leading principle, Unitarians differ in their opinions as to the origin, nature, and dignity of the author of their religion. Some believe him to have been a celestial spirit of great power and dignity, existing before all worlds, and employed by the Father as his instrument or agent in the creation of the universe, or at least of this portion of it in which we dwell. These are usually called, and call themselves, Arians; though differing in various particulars from the distinguishing tenets of that celebrated heresiarch. Of this class were the late Dr. Price and many of the principal English Unitarians in the earlier part of the last century, but those who hold these opinions at the present day are exceedingly few in number. Others believe Jesus to have had no existence previous to his birth, and to have been simply 'a man approved of God by miracles and wonders and signs, which God did by him' (Acts ii. 22). They also generally reject his supernatural birth, as recorded in Matthew and Luke, on the alleged ground that the chapters containing those accounts are wanting in some of the old MSS. of the New Testament, and are altogether less authentic than those portions of the Gospels which record his life, death, and resurrection. These are not unfrequently styled Socinians: but they themselves almost universally reject this appellation, both because it is usually given as a term of reproach, and also because Socinus held certain opinions of which they disapprove, particularly the duty of praying to Christ, contrary, as they think, to his own express injunction (John xvi. 23). Unitarians believe that in Christ dwelt all the fulness of the Godhead, inasmuch as the Spirit was not given by measure unto him; and that, as he was invested with full power to make known to the children of men the

will and intentions of God concerning them, they require no other evidence than his authority for receiving all which he delivered as coming from God. On this authority they believe that there will be a resurrection from the dead, both of the just and of the unjust, when all shall be rewarded according to their works, and when Christ himself shall come in the glory of his Father to judge the living and the dead. They believe that the truth of this declaration was established and exemplified by his own resurrection from the grave. They believe that he was sent to include both Jew and Gentile in the terms of a new and better covenant; and to admit the whole race of mankind to a participation in the privileges of the family of God. For this reason it is that the death of Christ is described by himself as the blood of the new covenant, shed for many for the remission of sins; and hence Unitarians receive him not as God himself, but as the *image* of God (2 Cor. iv. 4), and a ray of his Father's glory—as the one Mediator between God and man.

Unitarians have always held that the death of Christ, although important and necessary as an attestation of the truth of his mission, and a preliminary to his resurrection, was not so important to mankind as his life, teaching, and example—differing in this respect from nearly all other Christians. They assert their belief in the Atonement; understanding that term in the sense in which it is used in the only place where it occurs in the New Testament, namely, reconciliation. They say that, men being enemies to God by wicked works, they were reconciled by the death of Christ, that is, by the new covenant of grace and mercy ratified by his death, in as far as they have been reclaimed from sin to a life of righteousness. In this sense they think that Christ died *for* us; not in our stead, but on our behalf; to procure for us the benefit of a new and better dispensation. Thus the terms or conditions of salvation are 'repentance towards God, and faith in the Lord Jesus Christ.' They deny that these views are liable to the charge sometimes brought against them of underrating the evil of sin, considering that by repentance is meant not merely sorrow for sin, but a change of mind and heart leading to future amendment, and, where possible, to restitution.

The charge sometimes brought against them of relying on their own merits for salvation, they also deny. They profess to look for everything they have or can expect solely to the free grace of God, manifested in the gospel of Christ. This alone is the *procuring* cause of salvation, of which conversion, where necessary, and repentance and better obedience, in all cases, are the prescribed and indispensable conditions — conditions which they believe that all men are competent to fulfil, by a diligent and conscientious exercise of their natural powers. These powers, and the entire constitution which man inherits at his birth, they believe to be such as his Maker intended them to be, not less capable, in their own nature, of religious and moral improvement than those of the first man, when cultivated with due care, exercised under an influential sense of the divine presence, and a habitual application for the divine assistance and blessing promised in the gospel of Jesus Christ. It will thus be seen that Unitarians reject the generally received doctrine of original sin.

For the most part they adhere to the doctrine of Universal Restoration, considering punishment, both here and hereafter, not as the expression of what is called *vindictive* justice, but as the instrument of a remedial discipline, destined ultimately to bring back the sinner from the error of his ways. Others, however, believe in the final destruction of sinners. But it should be observed that on this, as on all other points, it is difficult to give any precise statement; because in fact there does not exist any Unitarian *Creed*, or standard, which the general body have ever formally recognized as of authority. No Unitarian will allow himself to be held responsible for the opinions maintained by any other, let his talents, eminence, or reputation be what they may.

This brief sketch of the opinions entertained by this body would have applied to nearly the entire community in England twenty or thirty years ago, and it is still a fair representation of the views held by the majority, especially the older members. There are now, however, two distinct schools among Unitarians, as in nearly every other religious denomination—the conservative, and the radical or progressive. The latter hold opinions more or less in sympathy with the advanced German writers of the present century. For instance, they consider that reason and conscience must be the ultimate court of appeal on all questions of religion and morality, and although regarding the Bible with veneration, they maintain that it is only inspired in a greater degree than other works; that it is fallible, and in some matters positively incorrect; and that it must be subjected to exactly the same method of critical treatment as other ancient books, and no statement taken for granted because it is found in it which would not be accepted if found in any other work. As to the miracles, too, they are generally regarded as pious legendary accretions around a substratum of fact, and, at all events, cannot be admitted as true unless their authenticity can be established by such evidence as would be satisfactory to impartial inquirers in any matter in which religious prejudices and pre-convictions could have no influence. On the other hand, the conservative Unitarians are still content to rely chiefly on the Bible in support of their views; and maintain that as Christianity is a system of morality and religion specially revealed by God, and external to man's nature, it required some proofs of its divine origin beyond its inherent credibility and adaptation to human wants; and this evidence they consider is aptly supplied by the miracles. With respect to the question why the Jewish and Christian miracles alone should be accepted, and those of other religions repudiated, they assert that there is an essential difference between them, inasmuch as nearly all the Christian miracles are exhibitions of benevolence, and in thorough harmony with the character of Christ, while the miracles of other faiths are generally mere exhibitions of power, and often of revenge.

Although not as yet very powerful in point of numbers, the influence of the new school is already very great throughout the Unitarian body, as was proved at the annual meetings of the British and Foreign Unitarian Association in 1866–67, when an attempt was made by a few of the more conservative party to define the term 'Unitarian Christianity;' but this was opposed on the ground that the society should be made as comprehensive as possible, and was almost unanimously rejected. In fact, for some time past, many Unitarians have been anxious to get rid of the name altogether, as being a doctrinal and sectarian appellation, and have endeavoured to unite the liberal thinkers in every denomination, quite irrespective of differences of opinion as regards doctrinal matters.

Without touching on the controversies which have arisen respecting the history of Unitarianism in the

primitive church, it may be sufficient to observe that it quickly made its appearance among the leading reformers of the sixteenth century. The fate of Servetus, who was burned at Geneva for the profession of these sentiments, is the foulest blot on the character of Calvin. Several of the most eminent of the Italian reformers of that period were anti-trinitarians of different degrees, some of whom became distinguished lights and founders of Unitarian churches in distant lands. In this country, during the reigns of Edward VI., Elizabeth, and James I., several persons expiated the offence of this form of heresy at the stake; but the first religious society established in England avowedly on this principle was gathered in the time of the Commonwealth by Biddle, who may therefore be styled the father of English Unitarianism. The Unitarians of the present day in this country are chiefly the descendants and representatives of that branch of the early Nonconformists who received the denomination of Presbyterians; and they are still known by that name in some places, though no Presbyterian form of church government, properly so called, has ever existed either among them or their predecessors. A smaller body are General Baptists; and a few societies now Unitarian originally belonged wholly or partially to the Independent denomination. In the proper sense of the word they are all Congregationalists; inasmuch as every society is a distinct religious community, acknowledging no external control upon earth in spiritual concerns.

In England and Wales the Unitarians have upwards of 300 places of worship. In Scotland their doctrines have not met with much success, and there are at the present day only five congregations in the whole country. In the north of Ireland, however, there are about forty Unitarian chapels, which are generally known as Presbyterian, the original founders of them having been so styled, and the present members having adopted that form of church government.

In the United States of America there are at least four distinct religious bodies who profess anti-trinitarian opinions:—1. A large portion of the Congregationalist churches in Massachusetts, with a few in the adjoining states of New England; to which may be added churches of the same denomination in several of the principal towns in other parts of the union. 2. The Universalists, whose leading tenet is the doctrine of universal restoration, but who have in general adopted some modification of Unitarianism. 3. A considerable majority of the American Quakers, from whom their orthodox brethren have seceded, and formed a distinct community. 4. A numerous denomination who call themselves 'Christians' by way of distinction, refusing to be enrolled as the followers of any other body.

At Geneva, once the fountain-head and stronghold of Calvinistic opinions, Unitarianism prevails; and in Transylvania the descendants and followers of Socinus, Davideis, and other reformers of the sixteenth century, still form a numerous community. Throughout the whole of the Continent the persons known as 'Liberal Christians' hold more or less the Unitarian views.

(Those who wish to obtain further information on this subject are referred, among other sources, to Lindsey's *Apology and Sequel;* Lardner's *Letter on the Logos;* Belsham's *Calm Inquiry;* Carpenter's *Unitarianism the Doctrine of the Gospel;* Yates' *Replies to Wardlaw;* the Doctrinal Discourses of the late Dr. Channing; Dr. Beard's *Unitarianism in its Actual Condition; Religious Life in England,* by the Rev. J. J. Tayler; and *Unitarianism in the Present Time,* by the Rev. John Orr.)

UNITED PRESBYTERIAN CHURCH. This religious body, the third in size among the Presbyterian churches of Scotland, is composed of two denominations, the United Secession and the Relief churches, which were formed into one upwards of twenty years ago. The former originated in 1733. Its principal founder was Ebenezer Erskine, minister of Stirling, whose talents, learning, and piety had obtained for him great influence in the church and the country. He felt deep dissatisfaction with the measures adopted by the General Assembly of the national church, in enforcing the law of patronage, intruding the nominees of patrons into benefices contrary to the wishes of the people, and in the toleration of erroneous doctrines without adequate censure. On the 10th of October, 1732, as moderator of the synod of Perth and Stirling, he preached a sermon before the synod, remonstrating against these violations of the constitution of the church, and of the rights of the people. The synod censured him for these statements, and, on appeal, the sentence was affirmed by the General Assembly in May, 1733. Mr. Erskine presented a written protest against this decision, to which other three ministers gave in their adherence. This document gave great offence to the court, and after a fierce and tumultuous discussion the four clergymen were ordered to retract their protest, under the penalty of suspension, or even deposition from their office. As they refused to comply with this demand, they were suspended by the commission of Assembly, in August, from the exercise of their office, and deposed in November, and their churches declared vacant. When this arbitrary decision was intimated to them, the four clergymen protested against it as illegal and invalid, declared that they still adhered to the original principles of the Church of Scotland, though they were now compelled 'to *make a secession* from the prevailing party in the ecclesiastical courts,' and they concluded their dignified protest by an appeal to 'the first free, faithful, and reforming General Assembly of the Church of Scotland.' A few weeks later (December 5, 1733) they formally constituted themselves into a presbytery.

The harsh and unjust treatment of these zealous and faithful ministers excited great agitation throughout the country. The dominant party in the church felt that they had gone too fast and too far, and perceived that some concessions must be made in order to allay the popular indignation which their measures had excited. Accordingly, at the meeting of Assembly in 1734, some of the more obnoxious and arbitrary of the recent enactments were repealed, and the synod of Perth and Stirling was authorized to restore the ejected ministers to their respective charges. They refused, however, to return to the bosom of the church from which they had been expelled, alleging that they had no security against a repetition of the unconstitutional and sinful acts against which they had testified, and no evidence that the course of defection was in reality abandoned. They took their stand at once upon the original constitution and principles of the Scottish church, and thus put an impassable gulf between them and the men who now guided its councils and decisions. In 1737 the seceders were joined by Ralph Erskine, of Dunfermline, brother of Ebenezer Erskine, and three other ministers, and they appointed Mr. Wilson, of Perth, a clergyman of great ability and learning, professor of divinity, to educate candidates for the ministry, and adopted various other measures for extending and perpetuating the secession. In 1739 the eight clerical ministers of the 'Associate Presbytery' were summoned to appear before the General Assembly.

They obeyed the summons, appearing before the court as a constituted presbytery, and formally declined the Assembly's authority. In the following year they were all deposed, and ejected from their churches.

The loss of their position and emoluments as ministers of the Established Church in no degree diminished the influence and popularity of the seceders. They rapidly 'grew and multiplied.' The presbytery speedily expanded into a synod, which in 1745 consisted of forty-six churches, and new accessions were made to their ranks from all quarters of the country. Their progress, however, was greatly impeded by a controversy among themselves respecting the religious clause in the oath taken by burgesses in Edinburgh, Glasgow, and Perth, which the one party insisted was inconsistent with the Secession Testimony, and the other wished to make a matter of forbearance. After several long and stormy discussions, an entire separation took place in April, 1747, between the contending parties, and they formed themselves into two distinct bodies, popularly termed 'Burghers' and 'Antiburghers.'

Meanwhile cases of violent settlements of ministers increased throughout the country, and out of the contests which these proceedings caused in the church courts originated another secession from the Established Church. In 1752 the General Assembly peremptorily ordered the presbytery of Dunfermline to induct an unpopular presentee to the church and parish of Inverkeithing, and enjoined all the members of the presbytery to attend on the occasion. Six ministers who were absent from conscientious scruples were brought to the bar of the Assembly; three of them were visited with minor penalties, and a fourth, Thomas Gillespie, minister of the parish of Carnock, was deposed on the spot. This tyrannical and utterly indefensible proceeding led to the formation of a second body now included in the United Presbyterian Church, viz., the 'Synod of Relief,' of which Mr. Gillespie, Mr. Boston, a son of the celebrated Thomas Boston, of Etterick, and a Mr. Collier were the founders.

The seceders steadily increased in numbers, and not only erected congregations in all districts of Lowland Scotland, but sent preachers to England, Ireland, and even to America. The tranquillity both of the Burgher and the Antiburgher churches was disturbed towards the close of the eighteenth century by a discussion respecting the power of the civil magistrate in matters of religion, which ultimately led, thirty years later, to the celebrated 'voluntary controversy,' whose influence upon the religious condition of Scotland has been most momentous. In 1820 the Burghers and Antiburghers were united into one body, termed the United Secession Church, and in 1847 a junction took place between that church and the Synod of Relief, under the designation of the United Presbyterian Church. It has the same standards, the same Confession of Faith and Catechism, and the same form of government, ritual, and worship as the Established Church. But its ministers are supported by the voluntary contributions of the people, and all the office-bearers are elected by the members, male and female.

Candidates for the ministry in this church must attend at least four sessions at one of the national universities, and five sessions at the divinity hall, which consists of four chairs of theology, and is attended by from 130 to 180 students. There are thirty-one presbyteries and 596 congregations connected with the United Presbyterian Church. The membership amounts to 174,930, the average attendance in the churches to 204,265, the number of elders to 4595, and the annual baptisms to 11,327. The number of Sabbath school teachers is 9339, and of scholars 73,754, besides 18,442 taught in Bible classes. About a fifth part of the population of Scotland is connected with this church. The total income of the church amounted in 1866 to 275,105*l.*, and in addition, the sum of 47,556*l.* was raised during the year for the liquidation of debt on churches and manses. The income for the last seven years amounts in all to 1,657,085*l.*, and the amount contributed during that period for the liquidation of debt to 254,792*l.* The stipends of the ministers vary from 120*l.* to 800*l.* a year. In nearly all the country congregations a manse is also provided.

There are a considerable number of missionary congregations supported by the United Presbyterian Church in Jamaica, Trinidad, Old Calabar, Caffraria, and India.

UNITED STATES, THE, a federal republic occupying more than half of the temperate zone in North America, lies between 24° 30′ and 49° N. lat., and between 66° 50′ and 124° 30′ W. long. The territory is bounded on the N. by British America, from which it is partly separated by the Lakes Superior, Huron, St. Clair, Erie, and Ontario, and by the river St. Lawrence; E. and N.E. by the British province of New Brunswick and by the Atlantic Ocean; S. by the Gulf of Mexico and the Mexican Republic, from which it is partly separated by the Rio Grande del Norte; and on the W. by the Pacific Ocean: the whole forming a parallelogram of 2400 miles in mean length from E. to W., and of 1300 miles in average breadth from N. to S. The extreme length, however, is nearly 2700 miles, and its greatest breadth about 1600 miles, thus presenting a frontier line exceeding 10,000 miles. The area of the United States has been more than doubled since the formation of the confederacy, by the purchases from France, in 1803, of the territory of Louisiana, and of Florida from Spain in 1819; the annexation of Texas in 1846; the conquest of California and New Mexico in 1848; and the purchase of a portion of northern Mexico in 1854. The whole forms an area, according to the estimate made by the Topographical Bureau at Washington, of 2,936,166 square miles, nearly equalling in extent that of the continent of Europe. In addition to this vast territory in the centre of North America, the United States in 1867 purchased from the Russian government the north-west corner of the continent, formerly known as Russian America, and now called Alaska. This new acquisition, which is bounded inland by the 141st parallel of west longitude, and includes a strip of maritime territory extending southward to the border of British Columbia, has an area of nearly 400,000 square miles, or about twice that of France; but the interior is wholly uninhabitable by civilized man, being subject to the severest cold and having a very scant vegetation. It is occupied only by a few Indians and Esquimaux, and is valuable solely for the supplies of skins of fur-bearing animals, which are obtained in large numbers. The only foreign possessions belonging to the United States are the small islands of St. Thomas and St. John in the West Indies, both of which were purchased from the Danes in 1868.

Face of the Country.—In an extent of country reaching from the Atlantic to the Pacific Ocean, and through 24° of latitude, as might be expected, every variety of surface—mountain, plain, and valley—is found. Topographically considered, the United States are divided by the Alleghany mountains in the E., and the Rocky mountains in the W., into three grand sections: 1. The Atlantic or Alleghany Slope; 2. The Pacific or Rocky Mountain Slope; and 3. The Mississippi Valley. The

first, lying between the Alleghany Range and the Atlantic Ocean, commences in the E. part of Maine, and extends (with a breadth varying from 80 to about 300 miles) to Alabama. This region, near the sea, is generally bordered by a belt of alluvial sand, and, where uncultivated, is usually covered with a growth of pine and cedar. Farther inland the country becomes hilly, and gradually merges into the Appalachian chain of mountains. The rivers of this section mostly run in a S. or S.E. direction, with lengths varying from 100 to 600 miles, and are ascended by the tide to the hilly country, a distance of from 50 to 150 miles, to which point they are generally navigated by the smaller ocean craft and steamboats. The second section includes all the country lying W. of the Rocky mountains, and between them and the Pacific, occupying a tract varying from 600 to 1000 miles in breadth, intersected by several mountain ranges of great elevation. The third and largest section, called the Mississippi Valley, comprises that vast region lying between the Alleghany mountains on the E., and the Rocky mountains on the W., extending through 18° of latitude, with a breadth of from about 800 to 1600 miles. A high table-land terminates this valley on the N. From its most elevated points, about 1900 feet, or an average of 1450 feet above the sea, the streams descend towards every point of the compass, some seeking the ocean through Hudson's Bay and the great lakes, and others through the Missouri and Mississippi rivers and the Gulf of Mexico. This plateau covers Minnesota, and parts of Wisconsin, Nebraska, and Iowa. The middle sections of the state of Ohio have an elevation of 1000 feet above the Gulf of Mexico. Outlying ridges of the Alleghany chain extend into Eastern Kentucky and Tennessee. The western slope of the valley ascends by an almost imperceptible rise to the height of 7500 feet, forming the elevated base of the more rugged prominences of the Rocky mountains. A low range, or rather belt, called the Ozark mountains, traverses portions of the Indian territory, Arkansas, and Missouri, and extends even into Wisconsin. Another low range, called the Black hills, runs through the E. and S. parts of the territory of Nebraska, forming the dividing ridge between the headwaters of the Missouri and its great tributary, the Yellowstone. The country adjacent to the shores of the Mississippi, below the mouth of the Ohio, is mostly low and level, and a large portion of it is overflowed on every great rise of that river. Immediately adjoining the Gulf of Mexico it is one great marsh. The prairie region, which stretches nearly from the right bank of the basins of the Mississippi and Missouri to the Rocky mountains, is of immense extent, but it is not, as is generally supposed, uniformly level. Its surface, on the contrary, is often rolling and billowy, sometimes swelling into very considerable heights. It is covered with long rank grass, being interspersed in Texas with clumps of magnolia, tulip, and cotton trees, and in the northern states with oak and black walnut. The prairies gradually diminish in beauty and verdure as they stretch towards the W., and become more elevated, till at length they imperceptibly unite with, and lose themselves in, the desert zone skirting the foot of the Rocky mountains.

Gulfs, Bays, Rivers, and Lakes.—In our articles on the different states we have so fully described the great waters of the United States that we shall confine ourselves here to such as have a national importance. Perhaps no portion of the globe is more favoured with facilities for navigation, both external and internal. Washed on the E. by the Atlantic, on the S. by the Gulf of Mexico, on the W. by the Pacific, and on the N. by the great lakes, Superior, Michigan, Huron, Erie, and Ontario, it presents, according to the report of the officers of the Coast Survey and Topographical Department, 12,609 miles of shore line, exclusive of bays, sounds, islands, and lakes; of which 6861 are on the Atlantic, 2281 on the Pacific, 3467 on the Gulf, besides 3620 miles of shore line on the northern lakes (including bays, sounds, and islands), and 49,065 miles of river shore line (including both banks), to the head of navigation in the interior, or to the head of tide in coast rivers.

The most important bays on the Atlantic coast are Massachusetts, Cape Cod, Buzzard, Raritan, Delaware, and Chesapeake; and on the Pacific, the Bay of San Francisco and the Straits of Juan de Fuca, leading into Puget's Sound, and having one of the best harbours in the world. Long Island, Albemarle, and Pamlico sounds, varying from 60 to 120 miles in length, are all on the Atlantic coast, the first washing the shores of Connecticut, and the last two that of North Carolina.

The interior of the United States is drained by some of the grandest rivers on the globe. Almost exactly through its middle, from the summit of the great table-land of Minnesota, runs the Mississippi for 3000 miles, like the trunk of a great tree, with its roots in the Gulf of Mexico, and its branches extending E. to the Alleghanies and westward to the Rocky mountains, receiving the tribute of perhaps 100 important affluents, some of them, such as the Missouri, Arkansas, and Red rivers from the W., and the Ohio from the E., streams of the first class in point of magnitude, and the volume of water rolled down their channels. These rivers are severally, in the order named, about 2900, 2000, 2000, and 1000 miles in length; while many of the secondary tributaries have courses of from 300 to 1000 miles. The country drained by the Mississippi reaches from Western New York and Pennsylvania on the E., to the summits of the Rocky mountains on the W., and from the 49th parallel of latitude to the Gulf of Mexico. The rivers of the Alleghany slope of the most importance are, beginning in Maine, the Penobscot, Kennebec, Connecticut, Hudson, Delaware, Susquehanna, Potomac, Chowan, Roanoke, Pamlico (or Tar River), Neuse, Cape Fear, Great Pedee, Santee, Savannah, and Altamaha, all rivers of at least 300, and some 600 miles in length, and all more or less navigable, some for vessels of the largest class, 100 miles or more, and all emptying themselves directly into the Atlantic, or into bays opening into that ocean. The southern slope, tending to the Gulf of Mexico, has also several large rivers independent of the Mississippi, viz., the Appalachicola, Mobile, and their large tributaries on the E. of the Mississippi, and the Sabine, Trinity, Brazos, Colorado, and Rio Grande del Norte on the W. of that river. These streams vary in length, including their main affluents, from 300 to 1800 miles, and are navigable by steamboats to various points within 500 miles. The Rio Grande forms the boundary between Texas and Mexico. The Pacific slope has but one great river breaking through the Cascade mountains into the ocean. This is the Columbia, a stream of 1500 miles in length, and with several important affluents having courses of from 300 to 800 miles. If we except the Straits of Juan de Fuca, there is but one other great opening into the territory of the United States on the Pacific border, viz., the channel or strait, from 1 to 2 miles in width, leading into the Bay of San Francisco, which receives the Sacramento and San Joaquin rivers, each about 300 miles in length. The Colorado of the

west, entering the Gulf of California, drains the E. and S.E. and S. portions of the great plateau between the Rocky and Sierra Nevada mountains.

The whole of the United States N. of the 42nd parallel of latitude is dotted over with beautifully transparent sheets of water of varied sizes, from a few miles in circuit to those majestic lakes or inland seas which separate British America from the United States. There are five of these, viz., Ontario, Erie, Huron, Superior, and Michigan; the latter only being wholly within the limits of the United States. These vast lakes are navigated by steamers of the highest tonnage, and by sailing vessels of large capacity, affording a continuous navigation by the aid of the Welland Canal around the Falls of Niagara, and that around the Saut St. Mary, of 1600 miles. These lakes cover areas of from 6300 to 32,000 square miles each, or a total of 90,000 square miles. The other chief lakes of the United States are Lake Champlain, the Great Salt Lake, and Pyramid, Mono, and Tulare lakes.

Mountains.—The Rocky mountains are the most extensive and important in the United States. They are, in reality, a part of the great chain which extends from the Polar Sea, under various names, to the Straits of Magellan, in South America. Commencing at the Pacific coast and going eastward, we come upon a chain of mountains stretching from the Straits of Juan de Fuca to about the 34th degree of N. latitude, where it joins the Sierra Nevada in the S. part of California. These mountains are in some places broken into scattered groups, some of which extend at right angles to the coast, but as a range they run parallel to the Pacific. They do not generally rise to an elevation of more than 2000 or 2500 feet. Mount Olympus, however, in the N.W. part of Washington territory, attains a height of 8200 feet: Mount St. John's, 8000; Mount Ripley, 7500; and Mount Diabolo, 3780 feet—all in California. Proceeding east, we come upon a lofty chain, bearing the name of Cascade range, in Washington territory and Oregon, and Sierra Nevada in California. The greatest heights in the United States are in this chain. Mount Shasta, Mount St. Helen's, Mount Hood, and Mount Rainier, rear their snowy summits to heights varying from 12,000 to 14,000 feet, and some parts of the Sierra Nevada are said to attain about the height of Mont Blanc, in Savoy (15,500 feet). This chain may be said to extend from Alaska to the southern extremity of Old California, at an average distance from the sea of from 100 to 150 miles, and to have a mean elevation of 5000 or 6000 feet. As we extend our journey towards the Atlantic coast, we pass irregular groups of mountains, some reaching the snow-line, and having various appellations, such as Blue, Humboldt, and Wahsatch mountains, and occupying the great basin between the Cascade and Rocky mountains. The latter run also parallel to the Pacific, at distances varying from 450 to 850 miles, within the territory of the United States, and attain, in Fremont's Peak (the highest known summit), an elevation of 13,570 feet. Having crossed this (the dividing ridge between the waters flowing into the Pacific and those flowing into the Gulf of Mexico), we descend a long slope of nearly 1000 miles, by an inclination of about 6000 feet from South Pass (on the great route to California and Oregon), to the Mississippi River, the grand recipient of the streams between the Alleghany and the Rocky mountains. The sources of the Missouri are at about 6000 feet elevation above the sea, those of the Plate at about 7500, of the Arkansas about 8800, and the Rio Grande 11,150 feet. Ascending from the left bank of the Mississippi, we come first, in Kentucky and Tennessee, upon outlying ridges of the great Appalachian range, which extends, with various interruptions, from Maine to Alabama. This is not a high range, though Mount Katahdin, in Maine, Mount Washington, in New Hampshire, Mount Mansfield, in Vermont, and Mount Tahawus or Marcy, in New York, reach severally the heights of 5000, 6324, 4280, and 5460 feet. South of New York this chain and its outlying ridges are mostly within an elevation of 2000 feet, though the peaks of Otter and White Top, in the S. part of Virginia, and Black Mountain (the highest land E. of the Mississippi), range from 4000 to 6476 feet, but in no case do the summits reach the line of perpetual snow. The head waters of the Ohio, Cumberland, and Tennessee rivers, which drain the western slope of the Alleghany range, are at elevations of from 1600 to 2500 feet above the sea.

Geology.—The White mountains consist of granite, which is also very prevalent in the greater part of New Hampshire and Maine. The Rocky mountains and the Sierra Nevada consist principally of granite intermixed with volcanic matter. Sienite, porphyry, and greenstone occur in the N.W. part of the Appalachian chain; gneiss forms the upper portions of New York and New Jersey; most of the mountain summits S. of the Juniata river consist of feucodial sandstone; and talcose mica, chlorite, and other slates, with crystalline limestone and serpentine, lie along the W. side of the primary belt in the middle and S. parts of the Union. Blue limestone, red sandstone, shales, anthracite coal measures, and other transition formations flank these rocks in many places. Secondary strata occupy by far the largest portion of the United States; but no strata corresponding in date with the new red sandstone or oolitic groups of Europe appear to be present. Tertiary formations, many of which abound with fossil remains, have been found in many parts of the Atlantic slope in Alabama, and in the S. part of the Mississippi basin; but they seem to be almost exclusively confined to these regions. The most extensive and remarkable alluvial tract is that around the mouth of the Mississippi.

Minerals.—The mineral wealth of the United States is more largely diffused than is generally known. Gold has been found in Virginia; and at an early period of the present century North and South Carolina, and the state of Georgia, contributed that metal so considerably to the mint of the United States, that it was deemed desirable to institute branch mints for the deposit of gold and the manufacture of coinage at New Orleans, Charlotte (N. C.), and Dahlonega (Georgia). At these three branches gold has been deposited at differents periods to the value of upwards of 33,000,000 dollars. Since the discovery of the far more productive gold fields of California, the search for gold in the Atlantic states appears to have been neglected, and the attention of the Americans has been almost exclusively directed to their Pacific gold fields. These were described as follows by Mr. Chase, the then secretary of the Treasury of the United States, in his official report for 1862:—

'The auriferous region of the United States stretches through near eighteen degrees of latitude, from British Columbia on the north to Mexico on the south, and through more than twenty degrees of longitude, from the eastern declination of the Rocky mountains to the Pacific Ocean. It includes two states, California and Oregon; four entire territories, Utah, Nevada, New

Mexico, and Dacotah, thus forming an area of more than 1,000,000 square miles, the whole of which, with comparatively unimportant exceptions, is the property of the nation. It is rich not only in gold, but in silver, copper, iron, lead, and many other valuable minerals. Its product of gold and silver during the year 1862, amounted to very nearly 100,000,000 dollars, and it must long continue.'

A great portion of the region described by Mr. Chase is as yet unworked; but enough is known of its general characteristics to establish the correctness of his description. From every one of the districts above mentioned, the precious metals have been produced. Utah, New Mexico, Nevada, Dacotah, Colorado, Idaho, Arizona, and the Washington territories on the Pacific, have all sent large quantities to the United States mints.

California commenced gold mining in 1848, and from that period to the end of 1864 the state produced 816,500,000 dollars, or 163,300,000*l.* Of this aggregate upwards of 555,000,000 dollars went into the United States mints for coinage, so that in sixteen years, California contributed nearly 112,000,000*l.* of gold to the coinage of the nation. It is said that about 10,000,000 acres of land have been 'mined;' but it is remarkable that these very acres, if no longer productive of gold in its natural form, are rendered peculiarly prolific of it in another. The lands dug for gold lie principally along the foot of the Nevada, and other ranges of mountains. They have a most delightful climate, and the 'pick' of the miner in his search for gold has just disturbed the surfaces sufficiently to render the soil peculiarly adapted for the planting of the vine and other fruits, all of which thrive in California.

Colorado, which has produced the second largest quantity of gold of any of the new divisions of America, is situated immediately west of the state of Kansas, and between that and Utah. This country was first explored in 1802. The knowledge of it, however, remained very meagre until 1858. In the summer of that year a few adventurers and explorers, from Kansas and Georgia, followed up the Arkansas River, and found a very superior quality of washed gold in paying quantities. Close to the spot where this discovery was made, has sprung up the town of Denver, now the capital of Colorado. In May of the following year (1859), the Gregory mines were discovered, and quartz mills having been put in operation, a large emigration soon began to set in to this El Dorado. In 1863 the district sent 2,883,336 dollars into the United States mint. The gold generally presents itself in large masses of quartz.

The state of Oregon, the third most productive gold state of America, lies on the Pacific, immediately to the north of California. The district was organized in 1848, and admitted into the Union as a state in 1859. Near the southern and on the eastern borders extensive and rich gold fields have been discovered. In fact, the whole country is said to be auriferous.

Utah, the territory in which the Mormons made their settlement after their expulsion from the state of Illinois, is a part of the district ceded by Mexico to the United States in 1848. It is far more a pastoral than a mining country; yet gold and silver are found in it, and some mines are worked with advantage, at a place called Egan Canon, on the Overland Mail route, about 200 miles to the west of the Great Salt Lake.

New Mexico and Arizona, which fill up the space between the state of Texas and the southern part of California, both belonged to Mexico until 1848, when this district was acquired by the United States. Though at present thinly inhabited, they are both old settled territories; and, in New Mexico especially, mines have long been worked with a view to the production of precious metals. But it is said that some of the most promising districts, especially of Arizona, have not been, to use an American term, 'prospected' at all, and others only in the most superficial manner. The 'Report of the Commission of the General Land Office,' transmitted to Congress in 1863, states that 'Arizona is believed to be stocked with mineral wealth beyond that of any territory of equal extent.' 'The richest districts are yet untouched.'

The territory of Washington is the most north-westerly of the United States. It lies between the British boundary and the state of Oregon, and borders on the Pacific. It has hitherto been chiefly known as a lumbering district and fishing station, but it is indisputable that of late years a large and increasing quantity of gold has been discovered in this locality, which will perhaps be regarded as the less extraordinary when its proximity to British Columbia is taken into consideration.

Idaho, another of the new territories, organized so recently as 1863, lies immediately to the east of the Washington district. The miners have discovered three sets of gold fields, called respectively the 'Barnock,' 'Centreville,' 'Salmon River' mines, which are all said to be productive, together with the 'Owhyhee' silver mines, which lie in the south-east corner of this territory. These mines produced, in 1864, as much as 6,000,000 dollars.

The new territory of Montana was recently separated from Idaho. Although only three years old, it has produced over 20,000,000 dollars of gold and silver.

Silver occurs in various parts of the United States, especially in the territories of Nevada, Idaho, and Montana, and in North Carolina. The first-named territory, which lies immediately west of Utah, and is situated between that and California, has proved to be most prolific in this metal. This district is said to have been actually untraversed before 1859. In the spring of the following year (1860), a discovery was made of an immense mine of silver, now known as the 'Comstock Lode,' of which it is said that 'no description can give an idea of its wonderful wealth.' 'The deeper the mine is worked, the richer and wider is the vein. The lode has been traced for a distance of 2 miles, and is believed to extend much further.' It is owned by nearly one hundred different companies, whose claims vary from 25 feet to 2000 feet each of the lode. A fine city, called VIRGINIA CITY, has sprung up in close proximity to these mines. The explorations are extending themselves to other parts of the country, and Star City, Humboldt City, Austen City, and Aurora, are all flourishing towns. Indeed the whole of Nevada is most rapidly increasing in population, and according to the most recent accounts new silver mines are being opened in different localities.

Deposits of silver also exist near Donna (Doña) Ana, in New Mexico, and on the San Saba in Texas. Rich mines of quicksilver are worked at New Almaden, in California, and platina has been discovered in California, Lancaster, Pennsylvania, and North Carolina.

Probably the richest and purest copper mines in the world are found in Michigan, on the shores of Lake Superior, where the native metals have been chiselled out in masses, weighing 150 tons of almost unadulterated copper. Mines of this metal, of great richness, are also worked in the S.E. of Tennessee, on the Hiwassee River, in North Carolina, and Connecticut, while it exists in greater or less abundance in New Mexico, Missouri,

Maryland, Virginia, New Jersey, Pennsylvania, Georgia, and various other parts of the United States.

The Galena great lead district, occupying the north-western portion of Illinois, and the adjoining counties in Wisconsin and Iowa, is exceedingly rich. Mines of the same mineral are also worked in Missouri, Connecticut, New York, and Pennsylvania. Very rich mines of zinc are found in New Jersey; it is also found largely mixed with the lead ore of the Galena district, and in Arkansas, Pennsylvania, and other states. Bismuth, antimony, nickel, and cobalt are all found in Connecticut. Tin has been discovered in small quantities in New Hampshire and Massachusetts.

Iron ore is widely distributed through the United States, but it is only in Pennsylvania and New Jersey that it is, at present, largely worked. On that field there are about 130 establishments for mining iron ore, and which altogether yield about 700,000 tons per annum. More than half the capital invested in iron mining in America is employed in this region. It does not appear that the trade is very profitable. It is admitted that 'it hardly holds its own, in spite of its admirable location, in the present condition of the manufacture, owing to the proximity of the district to seaports, which are glutted with foreign iron;' *i.e.* iron can be imported into the United States at cheaper rates than it can be produced there. And having regard to the enormous quantities and comparatively low prices of iron produced, during many years, in England, Wales, and Scotland, this is not a circumstance calculated to excite surprise. A most important convention of the iron and steel manufacturers in the States was held in 1866 to debate the question 'whether manufactured iron can be produced at lower than the present ruling rates; if not, then the American mills must either cease work or lower the wages of their workmen;' those wages must be reduced 'below the living rate of sustaining a good class of workmen, or the business of supplying the American market with rails and bar iron must be yielded to foreigners,' and in the opinion of the convention, the only way in which such a result could be avoided, was by increasing the duty on imported iron by Act of Congress, although this is at present very high on many descriptions. Besides the several iron-fields of Pennsylvania, the metal is raised and worked in different parts of the states of New York, New Hampshire, Massachusetts, Connecticut, Maryland, and Ohio. In the south there is an old iron-producing district in Virginia, and both the Carolinas have a number of forges and furnaces at work. In northern Georgia, passing into Alabama, along the line of the river Chattahoochie, there is a district which is officially represented to 'possess incalculable, inexhaustible abundance of the richest ores, though its production of iron still remains at a minimum.'

But the state which presents the greatest field for iron mining is that of Missouri, which appears to possess an inexhaustible supply of the very best ores. Iron is not found far below the surface of the earth, but in immense masses, or 'mountains,' towering above the ground. Of these, 'Iron Mountain' is the largest. It is composed exclusively of iron ore in its purest form. The height of this mountain is 228 feet, and its base covers an area of 500 acres; which is calculated to give 1,655,280,000 cubic feet, or 230,187,375 tons of ore. There is every geological reason to believe that this deposit extends downwards, enlarging as it descends; but on the supposition that the base is not extended, every foot of descent below the surface will give 3,000,000

tons of ore. 'Pilot Knob,' distant about 6 miles from Iron Mountain, is another of these stupendous masses. It rises 581 feet out of the valley in which it stands, and covers an area of 360 acres. There are several other 'Mountains' in this region, and it is computed that there is iron ore enough in Missouri to furnish 1,000,000 tons per annum of manufactured iron for the next 200 years. This district has naturally attracted the attention of capitalists and miners, and during the last decade several furnaces were put in blast. Unfortunately, however, it is deficient in its local supply of suitable coal, and the railway system of Missouri has hitherto been too incomplete to enable coal to be brought into it.

A considerable amount of capital has been invested during the last ten years in iron-mining in Michigan, which raised, in 1860, 130,000 tons of ore, or more than any other state in the Union excepting Pennsylvania and New Jersey. The business in this state is quite in its infancy; but the quantity of ore already produced shows what may be anticipated on the shores of Lake Superior, where minerals are said to abound, not alone in the American states which touch it, but, more especially, in the British territory. The ore is pure, of good quality, and is largely worked at Pittsburg. It contains 90 per cent. of iron, and is quite free from sulphur.

In 1860 the imports of iron into the United States from the United Kingdom were valued at 15,000,000 dollars, while the produce of the whole of the states in the same year were only valued at 2,000,000 dollars. It is true that it is claimed by the Americans that many of the large iron foundries in their country either own or farm mineral lands, and raise their own ore, the value of which would treble the above estimate; but there does not appear to be much foundation for this assumption, and any way it is clear that the bulk of the iron used in American manufactures is British.

Of other minerals, coal is the most abundant. The great anthracite bed in Eastern Pennsylvania already produces more than 10,000,000 tons annually, and is capable of increasing the supply to almost any conceivable demand. Small quantities of this species of coal have been found in some of the New England states and in New York, and a large deposit in North Carolina. A great bed of bituminous coal, commencing on the western slope of the Alleghany mountains, in Pennsylvania, extends in a wide belt through the western part of that state, through Ohio, West Virginia, Kentucky, Tennessee, and into North Alabama. Insulated bituminous coal-fields also exist in the counties around and W. of Richmond, Virginia, and in some of the central counties of North Carolina. The great bituminous coal-field of the western states occupies a large portion of Missouri, Iowa, and Illinois, where it exists in inexhaustible abundance. Professor Hitchcock is of opinion that a vast coal-field extends from 28° 45′ to 43° N. lat., and between 94° 30′ and 103° W. long. It is not meant by this that the coal exists everywhere, but, in the words of the professor, 'that a large part of this vast region may be underlaid by coal. The greater part may be, and undoubtedly is, covered by newer deposits, but if coal does actually exist, it may be reached beneath the newer rocks, as it has been in like instances in Europe, although no trace of it exists at the surface.'

Altogether the coal-fields of America are computed to be thirty-six times the size of those of Great Britain and Ireland, and to be equivalent to nearly three-fourths of the coal areas of the principal coal-producing countries of the world. As yet, however, they only produce altogether about 17,000,000 tons, while more than

100,000,000 tons are now annually raised in the United Kingdom.

It must be allowed that, for household purposes, there is not the same use for coal in America that there is in England. A very large proportion of the population live in a climate so warm, even in the winter months of the year, that fuel, except for culinary uses, is scarcely needed. The supply of wood, moreover, in many of the states, and especially in those north-western districts where fuel is more particularly needed, is so abundant and so cheap, that the want of a supply of coal is not yet much felt. Wood is still also very extensively used as fuel for steam-engines. Moreover, it is to be recollected that the water power of America is employed with great effect in working a very large proportion of its stationary machinery. The grist and flour mills, the lumber and saw mills, and very many other of those 'establishments,' as they are called, which are included in the returns of 'manufactories,' are exclusively driven by water power. A great saving in fuel is hereby effected.

But with all this the mining of coal in the United States is carried on to a far less extent than might be expected in a country claiming so much manufacturing progress, and in which there has been, of recent years, such great development. Connected with coal are the vast deposits of petroleum, or rock oil, which have recently proved such sources of wealth to many localities. [PETROLEUM.]

It will be evident from the foregoing, that the United States can be abundantly supplied from her own resources with most of the more important minerals; but at the present time neither iron nor copper is produced or manufactured in America at so low a rate as in Europe. This is not owing to absence of quantity, to inferiority in quality, or to want of skill, but solely to the difference in the price of labour. Where so much money can be made in other and far easier and more agreeable occupations, it is not to be expected that any large proportion of the population would employ themselves in mining, except under the stimulus of high rates of wages. And hence not only the disproportion between the quantities produced in America and other countries, but the disproportion in the prices of the articles. As America increases in population, and as railways become more available for the transport of freight, the metallic wealth of the country will, no doubt, be extensively developed; but her vast supplies of iron, especially, must rather be regarded as a store for future ages than as a source of wealth to be largely utilized at present.

Copious salt springs abound in various localities in the States, the total annual product being about 15,000,000 bushels. Medicinal mineral springs exist in many places, but those of the greatest repute are the Saratoga, Sharon, New Lebanon, and Avon springs, in New York; the Bedford springs, in Pennsylvania; the different sulphur springs, in Virginia; and the Blue Lick springs, in Kentucky. In the eastern states are extensive tracts of marl, and in different parts of the country nitrates and carbonates of soda and potassa are met with. Extensive beds of gypsum are found in New York, Maine, Virginia, and other states; but the largest bed of this mineral in North America extends from the Arkansas River, in the Indian territory, to the Rio Grande, in Texas, through a space of 400 miles. Building materials of an ornamental character are abundant, viz., marble, fine granite, sandstone, and breccia, or conglomerates. Porphyry is found in the vicinity of Boston and on the St. Croix River, between Minnesota and Wisconsin.

Climate.—A region so vast as that of the United States must necessarily include almost every variety of climate, from the long and frigid winters of the North, to the almost tropical regions of the South. It is a well-known fact that the temperature of western Europe is about 10 degrees milder than in the same latitudes in eastern North America; while California has a climate exceedingly mild, indeed partaking rather of the character of the tropical regions, especially in the S., with its wet and dry seasons. Again, on the plateaus of Utah and New Mexico, the climate is similar to that of the plains of Tartary. The summers of the northern part of the United States are as warm as those of Italy, while the winters are scarcely less frigid than those of Sweden and Norway. N. of 42° the climate is especially suited to the winter grains; that of the states between 36° and 42° favours the winter grains and Indian corn as staples; and that S. of 36° produces cotton, rice, sugar, Indian corn, and some of the tropical fruits. The temperature of the north-eastern states is rendered disagreeable by the cold and chilling winds and frequent fogs from the Atlantic in the spring months, causing pulmonary diseases, which swell the bills of mortality in that region beyond those of any section of the Union except Louisiana. Being shielded by no great chain of mountains towards the N., the great ice-plains of British America pour upon the United States, upon every considerable augmentation of heat in the regions S. of them, their cold blasts, causing sudden variations, often to the extent of 30° in a few hours, to be the unpleasant characteristic of the climate of the northern and central United States. Nor are the southern states entirely free from these sudden changes, when periods of unusually cold weather and unseasonable frosts destroy the orange buds of Florida and the cotton blossoms of the other southern states. At New Orleans, although the summer heat is intense, scarcely a winter passes without frost. The western states, from the Pacific to the Cataract mountains, have a climate almost precisely similar to that of Great Britain, being mild and humid, with frequent showers at all times of the year. The valley between the Cataract and Rocky mountains is very dry and arid, the westerly moist winds being drained in crossing the summits of the former. E. of the Mississippi, however, the rains are heavier than in most parts of Europe. The mean annual fall in this part of the Union is about 37½ inches, while that of N.W. Europe is only 31½ inches. Evaporation is, however, quicker in America, and there are more dry days there than in Great Britain. The central states have frequently in the same winter a mixture of the mildness of an Italian with the frigidity of a Russian one.

There are local causes affecting the climate of particular districts that must always be taken into consideration. The lakes, for example, mitigate to some degree the temperature of the regions bordering on them, while the elevated table-lands of New Mexico, Utah, and eastern Oregon are rendered cooler and drier than the same parallels elsewhere. In connection with climate it will be proper to speak of the diseases incident to the different sections of the United States. In the settling of all new countries the breaking up of the sod leads to miasmatic exhalations, producing agues and fevers that are not to be considered climatic, as they rapidly diminish as the country becomes settled. At present the prevailing diseases of the west are intermittent and bilious fevers and dysenteries; of the south, bilious fevers, with occasional desolating visitations of the yellow fever in the Gulf states. The rice swamps of Georgia and South Carolina are fatal to whites, but not

to negroes. In fact, nearly all the swamps and river bottoms in the south, especially the most fertile, are more or less malarious. The cholera has generally been more fatal in the Mississippi valley than in other parts of the Union. The most fatal diseases in New England and some of the northern and middle states are consumption and other affections of the lungs. The census tables show the greatest ratio of deaths in Louisiana (about twenty-three to each 1000 persons), and the least in Wisconsin (about nine to each 1000 persons). In Vermont, Iowa, Florida, Georgia, Michigan, Tennessee, North Carolina, Alabama, South Carolina, Pennsylvania, Indiana, Maine, Delaware, New Jersey, Virginia, New Hampshire, Illinois, and Arkansas, the ratio of deaths was the lowest, and in the order in which they are named, viz., from Vermont, about ten to the 1000, to Arkansas, about fourteen and a half to 1000 persons. The ratio of deaths was highest in the order named, in the following states, viz., Massachusetts, Missouri, Maryland, Connecticut, Kentucky, Rhode Island, Ohio, Mississippi, Texas, and New York; being from about nineteen and a half in Massachusetts, to about fourteen and a half to the 1000 in New York. It is proper to remark in regard to Florida, which is in winter a great resort for invalids from the North—in consequence of the evenness of the temperature, it never varying above 12 degrees—the catalogue of deaths may not have fairly represented the character of the state. In fact, Florida, the eastern slope of the Alleghanies, Vermont, the elevated country around the Gulf of Mexico, California, and Oregon, are amongst the most salubrious parts of the world.

Botanical Productions.—Botanists arrange the trees and shrubs of the United States in several provinces, each marked by a distinctive character and fixed limits. Two of these provinces extend northward into Canada, and two others pass over the boundaries in the southwest into Mexico; but the greater part is confined within the limits of the United States.

1. The Lacustrian province extends along the basin of the great lakes and the St. Lawrence, and has for its boundaries the limit of forests on the north, the coasts of Labrador on the east, the line of N. lat. 43° on the coast, curving gradually southward to the Alleghanies, where it ascends again to the parallel of 60° at the Rocky mountains. Among the characteristic trees of this province are the birch, of which five species are found; two species of alder, four of poplar, and four of spruce, or fir. Allied to the last-named are the pines, of which three only are found here, viz., the gray scrub pine, red or Norway pine, and white pine. There are two junipers, known as northern juniper and red cedar. The Canadian arbor vitæ, Canadian yew, and the larch tamarack are the only other evergreens. There are three species of cherry, and allied to these is the northern wild plum. There are four species of maple, three of ash, two of elm, and four of oak. The linden or basswood and red beech occur sometimes in large numbers, forming almost entire forests; the hop, hornbeam, ironwood, or leverwood, is less abundant, but occasionally appears with other trees. The box elder, the smooth sumach, and the service berry are the principal tree-like shrubs of the province.

2. The Appalachian province comprises all the Atlantic states S. of lat. 43° and E. of the border of the prairies, including thus both slopes of the Alleghanies and the low lands between them and the coast, as well as the Tennessee and Ozark mountains. This is divided for convenience into six regions, whose names sufficiently

explain their situation, viz., the Alleghany, Ohio, Tennessee, Carolina, Mississippi, and Florida regions. The trees of the Alleghany region are to a considerable extent allied, though often of different species, to those of the Lacustrian province. Evergreens are not abundant, four species only—the northern pitch pine, table mountain pine, Jersey scrub pine, and southern balsam fir—being all that are peculiar to the region. There are several varieties of oak, chestnut, hickory, walnut, and ash; and one each of logwood, willow, buttonwood, maple, sassafras, crab apple, locust, and fringe tree; of shrubs, two species of sumach, the velvet and poison, are the principal which are peculiar to the region. There are three species and numerous varieties of the grape common to this and the Ohio region, and one of them also to the Tennessee region. The Ohio region has but few characteristic trees, the most prominent being the Ohio buckeye, redbud, scarlet, and swamp oak, three hawthorns, a soft maple, the northern hackberry, and the northern prickly ash. To the Tennessee region belong the pawpaw, the cucumber tree, and the several varieties of some of the most useful woods peculiar to Alleghany. The coast or Carolina region, which really extends from Maine to Georgia, has for its characteristic trees the dogwood, magnolia, hawthorn, cypress, palmetto, pine, tulip tree, and oak, of each of which there are several species, one of the pines and the live oak being of very great commercial importance, as furnishing very fine timber. The characteristic forest vegetation of the Mississippi region consists rather in large forests of particular species than in any considerable number of species. The cottonwood is abundant along the streams; the cypress, swamp oak, hickory, and ash are also found in low situations. The catalpa, plane tree, and buckwheat tree, are among the more remarkable of the forest trees native to this region. The lime, lemon, orange, and fig, which have been introduced from the West Indies, flourish luxuriantly. In the Florida region the principal forest trees are the live oak, the Eugenia, the stinking cedar, two species of fig, the bitter wood, the bark of which is used for medicinal purposes, wild plum, cocoa plum, true pawpaw, custard apple, broad-pod acacia, box-leaved guava, and the broad-leaved poison sumach. A peculiarity of the region is the predominance of fruit-bearing trees.

3. The Campestrian province comprises the vast extent of prairie lands, reaching from the Saskatchewan on the N. to Texas on the S. The province is mostly treeless, except near the streams, and has very few trees which are not common to it with the Mississippi, Ohio, and Canadian regions.

4. The Rocky Mountains province, like the preceding, has few peculiar or characteristic trees as yet known. The table-lands stretching eastward from the summits of the Rocky mountain range are treeless and almost verdureless, except on the immediate banks of the streams, where a few cottonwood and other trees of quick growth and spongy fibre are found.

5. Of the Caurine or North-western province, only Washington territory and Oregon above lat. 42° 30′ belong to the United States. The abundant moisture of this region develops forest trees of immense height and girth; and though the number of genera is not as great as in the Appalachian province, there is a very considerable number of species, the evergreens predominating.

6. The Nevadian province, extending from lat. 42° 30′ to 32° N., is the home of the giant pines, cedars, and redwoods, trees of unparalleled size, many species of which are peculiar to this province.

7. The Mexican province, including New Mexico, Arizona, and northern Texas, is divided into three distinct regions, rising in successive table-lands from the low sandy desert to the Llano Estacado or Staked Plain and the plateaus of New Mexico. Except in isolated tracts, this province is not marked by an abundant forest growth, but the greater part of its trees are at least semi-tropical in character.

The character and quantity of forest vegetation is largely controlled by climatic influences. A humid climate, even if accompanied by low temperature, is favourable to the growth of timber; and hence we find northern Maine, New Hampshire, Vermont, and New York covered with immense forests. Where the cold is intense, and the fall of rain moderate, the trees, except the hardiest, are killed by the deep frosts. The trees of these cold regions are for the most part evergreens, though some species of the oak, beech, &c., thrive. In the Appalachian region again, forests are more abundant on the eastern slope of the Alleghanies than on the western, and far more so than in the Campestrian or prairie province, because the amount of rain is greater and the moisture more uniformly maintained. The clouds rising from the Atlantic are deprived of the greater portion of their moisture in their passage westward, and disappear in passing the Alleghanies. But for the great lake region of the north, which yields to the clouds a daily evaporation nearly or quite equal to one-third of that of the North Atlantic, and the Gulf of Mexico at the south, the vapours of which are driven northward by the south winds, the Mississippi valley would form another desert like that of Gobi. Along the western coast of North America there are forests of gigantic growth on the seaward slope of the Cascade and Coast ranges; while eastward of these ranges is a treeless region, where fuel can only be procured from the deposits of coal, and where crops can only be produced by irrigation. Lying between this and the head waters of the western affluents of the Missouri and Mississippi, is a still more barren and verdureless region, where rain rarely falls, and where, except along the banks of streams fed by the melting of the mountain snows, there is neither food for cattle nor fuel for the use of man.

The grasses indigenous to the United States are very numerous, and some of them of great value. Botanists enumerate seventy-one genera and 261 species of native *Graminaceæ*, including under this title some of the cereal grains and several species of maize, sorghum, sugar-cane, &c. In the northern and middle states the cultivated grasses are mostly of European origin and naturalized; but in the other districts there are many native species fully equal to these. Among such are the wild rice, found principally in the vicinity of the lakes and river banks; the bent grass, oat grass, and musquit grass, a native of Texas, of which there are several species and many varieties, furnishing most luxurious and nutritious pasturage to the cattle and sheep of that region; sorrel grass, wild rye, a native of the Gulf states, highly prized for a winter pasture; the blue grass, regarded throughout Kentucky and Tennessee as the best pasture grass known; wild oats or union grass, Bermuda grass, Oregon grass, Utah grass, &c.

Embracing a territory of such extent, the number and variety of flowering plants in the United States are very great. Each region has its flora, and each season its characteristic blossoms. In the north-eastern and middle states the most noticeable of the flowers of early spring are the brilliant blossoms of some of the *Compositæ*, and especially in the lowlands the bright yellow of the dandelion; a little later the dogwood is in full blossom, the tree being completely whitened with its creamy-white flowers; the snowy blossoms of the hawthorn are seen in all parts of the country; still later the wild roses and eglantines, as fragrant as beautiful, the showy broad-leaved laurel, blueberry and whortleberry, with their delicate pink and white flowers, as well as most of the fruit-bearing trees, are in full blossom. In October and November the neglected fields and roadsides are brilliant with the pink flowers of the aster, and the nodding plumes of the solidago, or golden rod. In May and June the prairies are resplendent with flowers of all hues. The deep blue of the larkspur violet; the white, red, and purple of the *Houstonia*, and the variegated clusters of *Claytonia*, *Caroliniana*, and *Virginica*, appropriately named 'spring beauty,' blending with the rich golden hues of other flowers, make a western prairie an attractive object. In the region extending from Carolina to Louisiana the magnolia, pinxter bloom, and rhododendron are the finest of the flowering shrubs; while the numerous species of *clematis*, with their white and purple flowers, the golden blooms of the *hypericum aureum*, the bright scarlet of the splendid catchfly, and the purple and carmine of the *hibiscus*, form a rich blending of colours. Although the modest flowers of the hawthorn are not conspicuous among the more gorgeous semi-tropical flora, its fruit attracts attention from the brilliancy of its colour. The southern states have no native rose, unless the Cherokee rose, usually said to have been brought from China, be really indigenous there. Among other very beautiful specimens are the hardback, with its rose-coloured corymb of blossoms, the sweet-scented shrub, the evening primrose, and the passion-flower, a native of North and South Carolina. The coarse but brilliant lobelias, and the asters and golden-rods, make up their full share of the flowers of autumn. Their monotony is relieved by other blooms equally showy and less coarse and weed-like in appearance. Texas has in many respects a different flora from any of the neighbouring states. Through April and May, and into the earlier days of June, a variety of brilliant flowers continue to blossom; but the summer heats soon dry up vegetation, except along the banks of the streams; the grasses protect their green leaves from the fierce and continuous heat by the thatch of dead grass which falls over them, and for two months nature dresses in russet, until, with the autumnal rains, new flowers spring up. Of solidago but a single species is known in Texas, and that not very abundant. A few species of the aster make their appearance, and the dahlia, a native of Mexico, finds its way across the border, but displays few of that infinitude of colours which careful cultivation has produced in the northern states and in Europe. The region north of Texas, and extending through Arizona, New Mexico, Utah, and Colorado, is not prolific in flowers. The flora of California and Oregon is very abundant, and differs greatly in character from that of the country lying east of the Sierra Nevada, or the Rocky mountains. The indigenous plant of California which in its season of flowering most attracts attention is the flowering currant, whose large crimson racemes are unrivalled in beauty; a kindred species is found in Oregon. A peculiarity of the flora of California is the almost entire absence of genera belonging to the two great orders *Rosaceæ* and *Compositæ*. The large genera of hawthorns, cherries, plums, apples, and bramble in the former are scarcely represented at all; while in the latter we miss aster, solidago, sunflower, fleabane, boneset, &c. The deficiency is, how-

ever, more than made up by the amplitude of other orders. In general it may be said that the flora of the United States comprises few or none of the great staples of food; the cereal and all the esculent roots are naturalized, but are by no means deteriorated by their transfer. The cucumbers, melons, squashes, &c., are also all naturalized, as are most of the fruits, especially the apple, pear, plum, peach, quince, and apricot. The edible berries, such as the strawberry, blackberry, raspberry, whortleberry, bilberry, cloudberry, &c., are indigenous. The great fibrous staples, too, cotton, flax, and hemp, are naturalized plants; while the agave, which possesses some qualities analogous to the last of these, is a native of the adjacent country of Mexico.

Zoology.—The zoology of the United States is essentially that of North America, nearly every species found on the North American continent having its habitat in some part of the states or territories. The *Quadrumana*, embracing the entire monkey tribe and its congeners, are wanting. Of the bat tribe there are three genera and eleven species. Of the *Carnivora*, the largest is the cougar, or catamount, often improperly called panther, which is not a native of America; it is a formidable animal, second in strength and ferocity to the lion and Bengal tiger. The wild cat, or bay lynx, and the Canadian lynx are the only other animals of the cat tribe. There are six species of the fox, and two of wolves. Of the bear tribe, there are the black bear, the grisly bear, the badger, the wolverine or glutton, six species of skunk, and two of the raccoon. The common seal is the only representative of its family in America. Among the deer family there is the moose, now confined to the north-eastern states, and very scarce even there; the wapati, commonly called the elk; five or six species of deer, one or two of antelope, and one of the sheep family—the bighorn or Rocky mountain sheep. The bison, or buffalo, is the only wild representative of the ox family. Of the amphibious mammals, a singular species of the manatee or sea-cow frequents the shores of Florida and the Gulf of Mexico. The porpoise, five or six species of dolphin, and the narwhal, are found along the coast. The smaller species of whale are not uncommon, while the great sperm whale appears at some distance from the coast. The *Insectivora* are represented by seven or eight species of the mole, and twelve species of shrew mole, all of them belonging to the genus *Sorex*. Among the *Rodentia* in the United States are the beaver, porcupine, squirrel, rat and mouse tribes, lemming, and rabbit, of each of which there are many distinct genera and species. The opossum is the single representative of the mammals forming so important a class in Australia. Of birds the kinds are exceedingly numerous, there being in some cases no less than forty species of a particular genera. There are five species of eagle, six of vulture, and thirty of hawk. The *Scansores*, or climbers, are represented by the Carolina parrot, the only bird of the parrot tribe in the United States, and the woodpecker. The order *Insessores* includes the thrush tribe, with the bird called robin (an entirely different bird to the one known by that name in Great Britain), the mocking-bird, and the cat-bird; the swallows, the finch tribe, which includes the sparrows; the kingfishers, crows, orioles, grakles or starlings, and humming-birds. Of *Rasores*, pigeons and doves of numerous species are found in vast numbers in the wooded portions of the western and north-western states, and are not uncommon in nearly every other part of the Union. There are no true partridges in the United States, the partridge of the northern states being a grouse, and that of the southern a quail; but grouse of many species, quail, wild turkey, and several other gallinaceous birds occur in great numbers. Of the *Grallatores*, or waders, there are the flamingo, heron, ibis, crane, coot, rail, sandpiper, avocet, snipe, gray plover, &c. The *Natatores*, or swimmers, are very numerous, there being about twenty species of geese, two of swans, and at least twenty of the duck family. There are also two species of pelicans, confined to the Gulf states, several of gulls, and half-a-dozen of cormorants.

In reptiles the United States are not very prolific. There is a considerable variety of tortoises, though few of great size; and the small islets along the coast of Florida, and the sandy spits along the shores of the Southern Atlantic and Gulf states, are frequented by the green and other sea turtles in large numbers. The alligator inhabits the rivers and bays of the Gulf states, and proves very destructive to cattle and small animals—sometimes, though rarely, attacking men. The Saurians are abundant, especially in the southern states, and include a great variety of lizards (the chameleon among others), skinks, horned frogs, monitors, &c. The Ophidians or serpents are very numerous, but only three genera, the rattlesnakes, mocasson snakes, and the vipers, are venomous. The black snake is the only boa in the States. The Batrachians embrace numerous species of frogs, toads, sirens, newts, and salamanders.

There is an immense number of genera and species of fish visiting or inhabiting the waters of the United States. The most remarkable of the spine-finned are the pickerel, perch, mackerel, sword-fish, and mullet. Among those with soft abdominal fins, the best known are the salmon, the shad, the menhaden, herring, pike, and carp; of those with soft fins at the throat, the cod (the fishery of which employs a very large force of men, and furnishes food for many thousands), flounders, flat fish, &c.; and of fish without ventral fins, several species of eels, both of fresh and salt water, and the lamprey. The shark, ray or skate, and the devil fish, are the most formidable of the monsters of the deep on the American coasts. Other fish well known and highly prized for the table are the halibut, tautog, blue fish, sea and striped bass, tom cod, porgy, &c.; and from the rivers and lakes the perch, roach, dace, brook trout, lake trout, giant pike or muscalonge, and the white fish of the lakes. Of molluscs, the *Acephala* are widely distributed on the sea-coast, and through the lakes and rivers. The oyster attains a very excellent flavour; and the soft-shelled clam and round clam are also valued as articles of food. Others of the order are the mussel, cockle, hammer shell, &c., &c. The pearl oyster has been found on the Californian coast, and many secrete pearls of considerable value. There are numerous genera and species of land snails and slugs, land soles, pond snails, limpets, whelks, ear-shells, mitre shells, and others. The *Crustacea* are very plentiful, and many of them edible. Crabs, lobsters, shrimps, &c., abound on the sea-coast; and the freshwater lobster and land crab are found in the interior. The wood louse is common everywhere in damp places; and many of the parasitic insects of this class are very abundant. There are some venomous species of the scorpion and spider, but the spiders, mites, &c., are for the most part harmless. The centipede, though properly belonging to the tropics, is occasionally found in the south-western states.

The insect tribe is very numerous. Beetles of many genera abound, as do locusts of not less than twenty-two species, some of them destructive to vegetation, but

none of them to be compared to the locust of Oriental countries. There are also the bee, wasp, hornet, and bumble-bee; a vast and beautiful tribe of butterflies; grasshoppers of many species; the whole family of flies, among which, besides the house pests, there is a blistering fly nearly equal to the Spanish. Other insect orders all have their representative; and as the tropics are approached their number and variety greatly increase. The *Annelida* have many representatives in the numerous worms which infest the country, some of them destroying the foliage of the trees, others penetrating the wood and roots of trees and esculent vegetables. The leech, which inhabits marshy ponds, though not equal in power to the Swedish leech, is yet formidable to those who expose themselves to its attacks.

Soil and Agriculture.—The diversity in respect to soil in the United States, is perhaps even more striking than that of climate, the extreme on the one hand being found in the rich alluvial deposits of the great Mississippi valley (where the mould is several feet deep), and on the other, in the barren plains of Nevada, New Mexico, Utah, and Indian territories. The agricultural capabilities of the Mississippi valley are believed to be unequalled on the globe, if perhaps we except the valley of the Amazon in South America. A belt of land of tertiary formation coasts the Atlantic from Long Island to the Gulf of Mexico (inclusive of both), which is about 60 miles in width, and mostly covered with pine and cedar, not very productive in its natural state, but easily improved by marl and other manures. The coasts of Massachusetts and Maine, and of New England generally, are rough, unproductive, and difficult of tillage, being better adapted to grazing than culture. The slopes of the Alleghanies and the hilly region at their feet are generally productive, especially in the valleys; while the Pacific watershed has comparatively only a small portion of cultivable land; but in that portion W. of the Cascade mountains, as in the valleys of the Williamette, Sacramento, San Joaquin, and other smaller rivers near the coast, the fertility is great. The slopes of the Rocky mountains are generally a barren lava, through which the rivers cut their way to great depths, without fertile valleys to border them. Deducting rivers and lakes the land surface of the United States is 1,926,686,800 acres. Of this area 1,450,000,000 are public lands, nearly one-third of which has been surveyed, and about 400,000,000 acres disposed of by sales and grants. The lands are surveyed by the government, divided into townships 6 miles square: subdivided into sections; and these into quarter-sections of 160 acres each, which are set apart for homesteads. The system of 'squares' by which every section and quarter-section is divided by lines running due north and south, east and west, precludes all dispute as to boundary or title. As the country is filled up and settled, new surveys are made, and undoubtedly one of the great attractions of the United States is, that there is so boundless an expanse of territory that for many years the price of land is not likely to be unduly raised by an immigration, however great, or by other means than the application of industry to the cultivation of the soil. According to the census of 1860 there were in the United States 2,044,077 farms, with 163,110,720 acres of improved land, and 244,101,818 acres of unimproved land. By improved land is here meant only such as produces crops, or in some way adds to the productions of the farmer. The average number of acres to each farm was 194. In 1850 the cash value of the farms under actual cultivation in the United States was 3,271,575,000 dollars; in 1860 it had risen to 6,645,045,000 dollars, being an increase of no less than 103 per cent. in the ten years.

Agriculture being as yet by far the most important interest of the country, we shall, in this article, speak of its great staples somewhat more fully than has been done under the heads of the respective states.

Among the objects of culture, maize takes precedence in the extent of its cultivation, as it is best adapted to the soil and climate, and forms the chief food of the people, as well as of animals, both in the North and the South. The first successful attempt of the English to cultivate this grain in the present territory of the United States, was made in the valley of James River, Virginia, in 1608. The yield at that time is represented to have been from 200 to more than 1000 fold. The present produce varies from 20 to 135 bushels to the acre. The quantity raised in 1850 was 592,071,104 bushels; in 1867 it had increased to more than 1,000,000,000 bushels. Of all the states Illinois produces the largest quantity. The next in order are Ohio, Missouri, Indiana, Kentucky, Tennessee, Iowa, Virginia, Alabama, Georgia, North Carolina, Mississippi, Pennsylvania, New York, which include all the most prominent of the corn-producing states.

Wheat, when the soil and climate are adapted to its growth, is preferred to all other grains, and next to maize is the most important crop in the United States, not only on account of its general use for bread, but for its safety and convenience for exportation. The wheat region of the United States east of the Rocky mountains, lies chiefly between the 30th and 50th parallels of N. latitude; west of that barrier it extends one or more degrees further north. The wheat crop of the United States, according to the returns for 1840, amounted to 84,823,272 bushels; for 1850, to 100,503,899; and in 1860, to 173,104,924. In 1867 the produce was about 220,000,000 bushels. The states in which the largest quantities are grown, come in the following order:—Illinois, Indiana, Wisconsin, Ohio, Virginia, and Pennsylvania.

The quantities of wheat and flour exported from the United States at different periods since 1791, are shown in the subjoined table:—

Years.	Wheat.	Flour.
	Bushels.	Barrels.
1791	1,018,339	619,651
1800	26,853	653,052
1810	325,924	798,431
1820	25,821	1,056,119
1830	408,910	1,806,529
1840	868,585	1,515,817
1846*	4,399,951	4,382,496
1850	1,026,725	2,202,235
1863	36,060,414	4,390,055

* Famine year in Ireland.

In 1863 nearly two-thirds of the entire quantity were shipped to Great Britain and Ireland. The following official table shows the ratio of increase in the value of the grain exports for forty years:—

Years.	Aggregate Value of Exports of Grain.	Percentage of Increase.
	Dollars.	
1823 to 1833	67,842,211	—
1833 to 1843	73,303,440	8·0
1843 to 1853	198,594,871	170·9
1853 to 1863	512,380,514	158·0

The culture of rye is principally restricted to the

eastern and middle states, but in some parts it is giving place to more profitable crops. The yield varies from 10 to 30 or more bushels per acre. The production increased from 14,188,637 bushels in 1850, to 21,101,380 in 1860.

In the Atlantic states the growth of barley is confined to the tract lying between the 30th and 50th parallels of N. latitude; on the Pacific side of the continent its range is principally between the 20th and 62nd degrees of N. latitude. The barley chiefly cultivated is the two-rowed kind, which is preferred for the fullness of its grain and its freedom from smut. The yield usually varies from 30 to 50 bushels per acre, weighing from 45 to 55 pounds to the bushel. The quantity raised in the United States, as returned by the official tables for 1850, was 5,167,016 bushels; and 15,825,898 bushels in 1860. This increase is principally due to the increased demand for barley for the manufacture of beer. Barley has never been much exported, being principally used in the manufacture of malt and spirituous liquors at home.

Buckwheat appears not to have been much cultivated prior to the last century. It is chiefly raised in the middle and New England states. From 30 to 45 bushels per acre is considered an average yield in favourable seasons and on suitable soils, but 60 bushels are not unfrequently obtained. The quantity raised in the states, in 1860, was 17,571,818 bushels, against 8,956,916 bushels in 1850.

Oats may be regarded as constituting one of the important crops in the United States. They are so hardy as to be suited to climates too hot and too cold either for wheat or rye. The growth is confined principally to the northern, middle, and western states. The yield varies from 40 to 90 bushels per acre, weighing from 25 to 40 lbs. per bushel. The total produce in 1850 was 146,678,879 bushels; and 172,643,185 bushels in 1860. Oats, like rye, have never been exported to any extent.

The kidney bean is said to have been extensively cultivated by the Indians of New York and New England long before the whites established themselves there, and both beans and peas were largely cultivated by the natives of Virginia prior to the first landing of Captain John Smith. The cultivation of the pea as a field crop is chiefly confined to the eastern, middle, and western states. The usual yield is from 25 to 40 bushels per acre, weighing about 64 lbs. to the bushel. In 1850 there were produced in the United States, 9,219,901 bushels of peas and beans; in 1860, 15,061,995 bushels. Mississippi produced the largest quantity, viz., 1,954,666 bushels. The other most productive states in this respect were North Carolina, Georgia, South Carolina, New York, and Alabama.

Rice was first introduced into Virginia by Sir William Berkeley in 1647, and into the Carolinas in 1694. Its culture in Louisiana was commenced in 1718 by the 'Company of the West.' This grain in the United States is chiefly confined to South Carolina (which produces nearly two-thirds of the whole quantity raised in the United States), North Carolina, Georgia, Florida, Mississippi, Louisiana, and Texas. The yield per acre varies from 20 to 60 bushels, weighing from 45 to 48 lbs. when cleaned. Under favourable circumstances, as many as 90 bushels to an acre have been raised. Another variety called Cochin-China, or dry mountain rice, from its adaptation to a dry soil without irrigation, is cultivated to a limited extent. It will grow several degrees farther N. than the South Carolina rice, but yields only 15 or 20 bushels to the acre. The total produce of the United States in 1840 was 80,841,422 lbs.; in 1850, 215,312,710 lbs.; and in 1860, 187,167,032 lbs. It will be thus seen that the cultivation of this article is decreasing.

The common Irish (or white) potato is regarded as of but little less importance in the national economy than maize, wheat, or rice. It has been found, in an indigenous state, in Chili, Paraguay, Ecuador, as well as in Santa Fé de Bogota, and more recently in Mexico, on the banks of the Orizaba. It was not until near the middle of the seventeenth century that it became generally known either in Britain or North America. In the United States it is chiefly confined to the northern, middle, and western states. Its perfection, however, depends much upon the soil and the climate in which it grows. The yield varies from 50 to 400 bushels per acre, but generally it is below 200 bushels. The quantity produced in 1850 was 65,796,793 bushels; in 1860, 111,148,867 bushels.

Sweet potatoes, a native of the East Indies and of intertropical America, appear to have been introduced into Carolina, Georgia, and Virginia, soon after their settlement by Europeans, being mentioned as one of the cultivated products of those colonies as early as 1648. It grows in excessive abundance throughout the southern states, and as far N. as New Jersey and South Michigan. The yield in 1850 was 38,259,196 bushels; and 42,095,026 bushels in 1860. Turnips are little cultivated, the climate generally being too dry.

The growth of hay is principally confined to the eastern, middle, and western states, from which the southern markets are mainly supplied, in the form of pressed packages or bales. The yield in 1860 was 19,083,896 tons. The amount of clover-seed raised in 1850 was 468,979 bushels; in 1860, 956,188; and of other grass-seeds, 416,811 bushels in 1850; and 900,040 in 1860. Of the clover-seed, Pennsylvania and Ohio produced nearly one-half of the whole.

In the production of hops the returns for 1860 show an increase of nearly 200 per cent. Almost the whole of the increment, however, was in the state of New York, which, from 2,500,000 lbs. in 1850, increased to 9,671,931 in 1860. This exceeds five-sevenths of the whole crop of the United States. The increase in the cultivation of the hop is in consequence of the growing demand in America for beer, which is, however, for the most part extremely badly made, by brewers who emulate the German lager beer production.

The tobacco plant is indigenous to Central America, and was cultivated by the aborigines in various parts of the continent, previous to its discovery by Europeans. Sir Richard Greenville found it in Virginia in 1585, when the English for the first time saw it smoked by the natives in pipes made of clay. Previous to the war of independence, nearly all Europe was supplied from America; but at present many of the sovereigns of the Old World derive a considerable part of their revenues from the cultivation of tobacco. The produce of the entire crop of the United States in 1840 amounted to 219,163,319 lbs.; in 1850, to 199,752,646 lbs.; and in 1860, to 434,209,461 lbs.

The introduction of the sugar cane into Florida, Texas, and Louisiana, is supposed to date back to their earliest settlement by the Spaniards or French. A perennial plant, very sensitive to cold, it is necessarily restricted to regions bordering on the tropics. On the Atlantic side of the States it does not thrive beyond the thirty-third degree of N. latitude, and the thirty-fifth parallel S. The quantity of sugar produced on an acre

varies from 500 to 3000 lbs., averaging perhaps from 800 to 1000 lbs. In 1815 it was estimated that the sugar made on the banks of the Mississippi alone amounted to 10,000,000 lbs. In 1818 the entire crop of Louisiana was only 25,000,000 lbs. In 1860 it had reached the enormous quantity of 221,726,000 lbs., besides 13,439,772 gallons of molasses. In the latter year the total produce of cane sugar made in the United States was 230,982,000 lbs., besides 14,963,996 gallons of molasses; of maple sugar, 40,120,205 lbs.; of maple molasses, 1,597,589 gallons; and 6,749,123 gallons of sorghum molasses.

As yet the vine is one of the least prominent among the different objects of culture in the United States. The returns of 1860 give the entire produce of wine at 1,627,242 gallons. The states producing the greatest quantity are California, Ohio, Pennsylvania, Indiana, and North Carolina. The annual consumption of foreign wines in the States averages only about one-fourth of a gallon to each person.

The cotton plant stands pre-eminent in the United States, both as regards its superior staple and the degree of perfection it has attained. The precise time of its introduction as an object of culture by the American colonists is not known. The seed of the Sea Island cotton was introduced from the Bahama Islands about the year 1785. It was first cultivated on Skidaway Island, near Savannah, and subsequently on St. Simon's Island, at the mouth of the Altamaha, and on Jekyl Island. Previous to 1794—the year after the invention of Whitney's saw gin—the amount of cotton produced in North America was comparatively inconsiderable; but since that period, there is probably nothing recorded in the history of industry (including its manufacture in America and Europe) that would compare with its wonderful increase. The chief varieties cultivated in the United States are the black seed, or Sea Island (*Gossypium arboreum*—a tree cotton, indigenous to India), known also by the name of 'long staple,' from its fine, white, silky appearance, and long fibres; the green seed (*Gossypium herbaceum*), called 'short staple,' from its shorter, white staple, with green seeds, and commercially known by the name of 'upland cotton;' and two kinds of Nankin or yellow (*Gossypium barbadense*), the Mexican and Petit Gulf. The average yield is about 500 lbs. to the acre. Mississippi occupies the first place as a cotton-growing state, having nearly trebled its production since 1850. In Virginia and North Carolina the cotton crop is becoming comparatively unimportant. The total quantity cultivated in the United States in 1840 was 790,479,275 lbs.; in 1850, 987,449,600 lbs.; and in 1860, 2,154,220,800 lbs., or 5,387,052 bales. Mississippi produced in 1860, 1,202,507 bales, of 400 lbs. each. The states which yielded the next largest quantities were Alabama, 989,995 bales; Louisiana, 777,738 bales; Georgia, 701,840 bales; Texas, 431,463 bales; Arkansas, 367,393 bales; and South Carolina, 353,412 bales.

Of wool, the total amount produced in 1860 was 60,264,913 lbs.; of which Ohio supplied 10,608,927 lbs.; New York, 9,454,474 lbs.; Pennsylvania, 4,752,522 lbs.; and Michigan, 3,960,888 lbs.; the next in order are, Vermont, California, Indiana, Virginia, Kentucky, and Missouri—the produce of the other states being comparatively unimportant. Vermont yields nearly half of the total quantity raised in the New England states, which is only 6,578,064 lbs. The Pacific states and territories show an extraordinary increase since 1850, when it was only 77,329 lbs. In 1860 the amount

was 3,489,350 lbs., of which California produced 2,683,109. The yield from this state has since very rapidly increased. Neither flax, hemp, nor silk, is produced in any considerable quantities in the States.

In consequence of the high price of labour, in no country of the world has such an amount of ingenuity been exercised in the production of labour-saving machinery as in the United States, and nowhere has it been so successfully applied to the commonest operations of agriculture. As regards the drainage, manuring, and fencing of the lands, the country is still very far behind Great Britain, where the soil is so much more limited and valuable; but, mainly from the advantage of the climate, the American farmer is able to produce a bushel of wheat at much less cost than the most scientific farmer can in England. The wheat, well protected by the deep snow in winter, comes rapidly forward in the cool weather of spring, and the bright sunshine of the summer months brings it to great perfection. As before stated, the average extent of farms in America is less than 200 acres, and except in the oldest states the soil is very generally cultivated by its owners and their families. There is no necessity for them to labour very hard after the first three or four years from their settlement. Manures are seldom used, except near the large towns and in the oldest cultivated districts.

In the year 1866, 4,629,312 acres of public land were disposed of, 1,892,516 acres of which were entered under the Homestead Act. The policy originally adopted relative to the public lands in the United States has undergone essential modifications. Immediate revenue, and not their rapid settlement, was formerly the cardinal feature of the system. Long experience has resulted in the conviction that the early development of the agricultural resources of the country, and the diffusion of an energetic population over its vast territory, are objects of far greater importance to the national growth and prosperity than the proceeds of the sale of the land to the highest bidder in open market. The pre-emption laws, therefore, confer upon the pioneer who complies with the terms they impose the privilege of purchasing a limited portion of unoffered lands at the *minimum* price. The homestead enactments relieve the settler from the payment of purchase money, and secure him a permanent home, upon the condition of residence for a term of years.

Live Stock and Provision Trade.—In treating of the agricultural products of the United States, due consideration must be given to their stock, which is not only important as regards home supply, but the extent to which beef and pork are exported renders this business important in considering the subject of national resources.

The total value of the live stock in the United States in 1860 was estimated at 1,089,329,915 dollars: equal to 217,865,983*l.* The total number of animals was estimated at 89,000,483; thus giving an average of about 2*l.* 10*s.* for each. The animals were classed as follows:—

	Number.
Horses,	6,249,174
Asses and Mules,	1,151,148
Milch Cows,	8,581,735
Working Oxen,	2,254,911
Other Cattle,	14,779,373
Sheep,	22,471,275
Swine,	33,512,867

These, it should be stated, are only the stock on farms and plantations. Those in the cities and towns

are not enumerated; and of course increase the aggregate number.

Highly bred horses are admittedly very rare in America, and there appears to be nothing in the country that compares in any way with European studs. The breeding of them has not been sufficiently regarded, and consequently the race is comparatively inferior. The 'Conestoga horse,' is, however, as a beast of burden, a very highly prized animal. He derives his name from a valley in Pennsylvania, to which state the original stock is supposed to have been introduced by some of its earliest settlers. The 'Conestoga' combines great strength with lightness and agility.

In the southern and Pacific states, mules and asses are largely bred as substitutes for horses. The mule is hardier than the horse; subject to fewer diseases; more patient; better adapted for travelling over rugged and trackless surfaces; less fastidious as to food; much less costly in feeding. He requires less grooming and attention, and usually lives and works to double the age of the horse. A mule is also more muscular in proportion to weight; and as a troop of mules will follow their leader, if that leader is only provided with a bell, they require on a journey much less attendance than a troop of horses. Hence, in many parts of the United States, mules are largely used as beasts of burden; their power of endurance and determined perseverance enabling them to overcome difficulties which are peculiar to that class of service. The number of mules and asses in the United States increased upwards of 100 per cent. between 1850 and 1860.

Working oxen increased in a much smaller ratio. The whole increase throughout the States was only 32 per cent.: in the eastern states, indeed, and also in Ohio, there was a decrease. This is to be expected; inasmuch as in districts which become more densely peopled and consequently more civilized, and (in the case of the United States) more wealthy, horses supersede oxen in agricultural and other operations. The use of improved agricultural implements also lessens the force required from working oxen, and consequently diminishes their use, as such implements come to be introduced.

The number of milch cows largely increases in those states which are turning their attention to dairy produce; and also in Texas, where the wild cattle appear to be increasingly domesticated. In the Pacific states there are more than two milch cows to every family of five persons: showing the extent to which those states are becoming breeders of stock.

A breed of short-horned cattle, originally imported from the valley of the Tees, appears to be amongst the most highly appreciated of any in the United States. The Americans boast that they have considerably improved on the original stock. 'Ayrshires' are much prized in Massachusetts, and have passed in some numbers into Michigan and the north-western states.

The dairy produce of the United States is very great, and between 1850 and 1860 it showed an increase, in butter alone, of nearly 50 per cent., the produce in the latter year being 459,681,372 lbs. The principal butter and cheese producing states are those most largely settled, as New York, Pennsylvania, Ohio, &c. New York supplies nearly one-fourth of all the butter made in the United States, and fully one-third of the cheese. Whilst the butter product has so largely increased, that of cheese was until very recently decreasing. The latter does not enter largely into the dietary of the people of the United States; and the quantity produced not only meets the demand, but leaves a considerable surplus for exportation. The New England states used to produce nearly 10 lbs. of cheese for each individual, it being estimated that not one-fourth of that quantity was consumed at home. The exports of this article from these states was not found, however, to meet the tastes of European customers, and consequently the manufacture languished. Very recently a 'cheese factory' system has been established in the great dairy districts of the state of New York and parts adjacent. Each farmer sends his milk to the dairy, and is credited for the quantity supplied. Skilled persons are employed at the factories to make the cheese; and it has been found that these factories turn out an article of far better quality than used to be made in private dairies. Pains have also been taken to suit the requirements of the European market, and the result has been such high rates of profit to the farmers and manufacturers, as have very greatly stimulated the business. The quantity of cheese imported into the United Kingdom from the States in 1866 was 415,726 cwts., value 1,386,447*l.*

Sheep until very recently have not been generally reared in the United States, either for their wool or for any other purpose than for the supply of mutton to the home population. Hence the sheep feeding in the more closely peopled states has not kept pace with the population: indeed, between 1850 and 1860 the number of sheep decreased throughout the United States from 93 to 71 per cent. of the inhabitants; the total number being 22,471,275 in 1860 against 21,723,220 in 1850, an increase of only 748,055. Except in the cases of fancy properties in the eastern states, and in those districts of the western states where there are large runs of sheep-feeding lands, very little attention has comparatively been paid either to the quality or the number of the animals produced. A great loss of sheep from dogs is complained of in the States, but, owing to the high price of labour, it is considered cheaper to endure this loss than to maintain an efficient staff of shepherds.

The hog is the animal by which the Americans have hitherto probably made their largest profits, though it may be doubted, from the increasing demand for beef and mutton in the United States, whether this will continue long to be the case. The raising of swine has proved to be so well adapted to the varied phases of agriculture in the States, that there is no district in which it is not carried on, although it is only of comparatively recent years that the pork trade has become one of commercial importance. Its growth, however, has been coeval with the development of the western states, which is to be mainly accounted for by natural causes. First, the animal flourishes best in a temperate climate; secondly, the country in which he is reared should be peculiarly productive of the most fattening descriptions of food; and thirdly, in order to effect the processes of cure with the least expense and the greatest certainty, the climate should admit of a somewhat severe winter. All these conditions are realized in the western states more perfectly than elsewhere. They have a temperate climate in summer; a soil which produces in the utmost abundance Indian corn, which proves to be the best of all possible foods for the hog; and a winter temperature well suited to every process requisite to the curing, packing, and export of meat. Thus immense numbers of swine are bred, and cities like Cincinnati have risen into very great importance on account of the trade.

The number of swine in the United States in 1860

was upwards of 33,500,000, which was, however, a decrease, as compared with the figures for 1850, if the increase in the population be taken into consideration. This falling off is attributed to the increased facilities for the transport of grain, and its consequent relative advance in price. The number of hogs annually killed can only be approximated. It is believed, however, that in 1860 the number reached 3,000,000, or about 10 per cent. of the stock of pigs.

In Cincinnati, a town erected on a site which, within the memory of man, was a forest, but which now has a population of 250,000, more than 400,000 hogs are annually killed and exported. Recently, however, this place has been quite surpassed as a pork-exporting town by the comparatively new city of Chicago, which was a mere Indian trading station till 1830, when a town was planned and laid out, the site being regarded as suitable for commercial development. So lately as 1840, however, it numbered only 4479 inhabitants. In 1867 the population was estimated at 200,000. It has grown to be the largest market in the world for corn, timber, and pork; the three great exports of North America. In 1835 a Mr. Clyburn commenced the pork trade at Chicago, by packing for export about 300 hogs. The trade developed itself slowly at first, but now there are about 1,000,000 hogs killed and cured annually.

The average yield of lard and weight of hogs packed is stated at—yield of lard, 34 lbs.; average weight of hogs, 192 lbs. Every item of the animal is turned to account. Not a particle is wasted, and the collateral trade in bristles, lard, oil, stearine, grease, skins, &c., has grown to be scarcely less important than the original trade in meat.

Manufactures, General Use of Machinery, &c.—The United States being essentially an agricultural country, and a country, too, suffering under a certain deficiency of labour, the manufacture of agricultural implements is in many respects the most important branch of the manufacturing industry. It is not indeed the largest branch, but its superior importance is attested by the fact that it was the industry which exhibited the greatest increase between 1850 and 1860, the value of the quantities produced being in 1850, 6,842,611 dollars; and in 1860, 17,802,514 dollars; or an increase of no less than 160 per cent. The high rate of wages has stimulated invention. Mechanical contrivances of every sort are produced, and there is scarcely a purpose for which human hands have been ordinarily employed, for which some ingenious attempt is not made to find a substitute in a cheap and efficient labour-saving machine. Many of these machines have been brought to Europe, and some of them are appreciated and largely used in Great Britain. The extent to which machines for ploughing, mowing, and reaping are used in America is much greater than in any other country in the world. It is estimated that there are not less than 250,000 machines for the two latter objects in use, each of which will cut an average of ten acres in a day of twelve hours. The American machines are generally exceedingly light and simple; many English implement makers regard them with some disdain, and have, in consequence, made frequent endeavours to improve upon them by strengthening and elaborating them. But it must be remembered that, in a country like America, the great merit and advantage of a machine is its simplicity and lightness. If it were cumbersome it could not be, to the same extent, a labour-saving machine; if it were complicated it could not be used, to the same extent, in those regions which are far distant from the cities where alone the frequent reparations consequent on complications can efficiently be made. Above all, a cumbersome and complicated machine would be unsuited to America, because such a machine must necessarily be an expensive one; and where the average size of farms is less than 200 acres, it is evident that the great bulk of the agriculturists could not afford, even if they required, a highly expensive implement. Lightness, simplicity, and comparative cheapness are absolutely essential to the perfection of an instrument in America, even although those qualities may be obtained at the cost of some strength, comprehensiveness, and elaboration.

Next to agricultural implements, the article in which Americans excel most is probably hydraulic machines. The first thing an American usually looks for, in making his settlement, is a 'water-privilege.' To turn this water-privilege to advantage he must have hydraulic machinery; and hence, of all the countries in the world, America possesses the largest number of water mills and hydraulic machines. They are used for nearly all purposes, but especially for grinding flour, sawing timber, working cotton mills, &c.

If it were not for the want of labour, which affects generally all the occupations of the United States, it might certainly be anticipated that a nation, which possesses cotton as a principal product of its own soil, would increase beyond precedent in the production of that class of fabric, which now enters the most largely into human consumption, and which holds the highest rank in the industrial occupations of the world. Labour, however, enters more considerably than anything, except machinery, into the cost price of cotton manufactures; and it is, therefore, not surprising to find that, in comparison with other countries in which labour and the necessary machinery are both cheaper, the cotton manufacture of the United States has not progressed in an equal ratio with those countries.

The cotton woven in America in the year 1860 was 422,000,000 lbs., valued at about 56,000,000 dollars, or say 11,000,000*l.*, but this cannot be regarded as a very large quantity. In the year 1860 the United Kingdom imported from the United States alone very nearly 2,000,000,000 lbs. of cotton, or five times the amount which was manufactured in the United States; and, considering the quantity of the raw material obtained from other nations, the quantity of cotton goods produced in the United Kingdom may be taken at ten times that of the Americans. In fact, the United States do not produce anything like sufficient cotton goods for their own home consumption, and even with the advantage of a high protective duty in their favour the American manufacturers cannot compete with those of other countries, even in their own market. The woollen manufactures in the States in 1860 were estimated at 14,000,000*l.*, but the business is not a flourishing one, and, as in the case of cotton, it is found more profitable to export the raw material to Europe, and import the manufactured article. Both the cotton and woollen goods made in America consist chiefly of inferior articles. The manufacture of worsted goods, including delaines, bareges, cashmeres, alpacas, &c., for ladies' dresses, is limited to three establishments. The hosiery trade is not considerable, but is increasing, owing to the high duty imposed on foreign articles. The carpet manufactories number upwards of 200. Carpets of all sorts are in large and increasing demand in the States, but hitherto all the better kinds of this article have

been imported; indeed, there are only six American manufactories capable of producing the finer class of carpetings required in the best houses. The manufacture of linen goods has made but little progress in the United States; and farmers have often grown flax merely for the seed, and thrown out the fibre as valueless—showing that there is no demand for it in America for any manufacturing purpose. There is a limited manufacture of sewing silks in America, and there are a few ribbon and silk-trimming manufacturers in New York and Philadelphia; but nearly all the silk goods consumed in the United States are imported from Europe.

Next to the hydraulic machinery of America, the printing press may be considered to rank in importance; and here nearly every European nation has been excelled by the American inventions. Their machines are worked with great expedition, facility, and economy; and to them must be attributed the honour of inventing the celebrated Hoe's machine, which is described in the article PRINTING, and which has so much facilitated the production of cheap newspapers, as it can be worked with wonderful rapidity, and yet so smoothly that a thin and therefore cheap paper can be used almost as well as a stout one—a consideration of the highest importance in relation to the profit upon the issue of a penny paper. The printing press of the United States is, relatively, so cheap that it can find its way into the most distant districts of the country, and there is scarcely a town of any importance in which there is not a daily paper. There are altogether nearly 400 daily newspapers issued in the United States, and no less than 3500 daily, weekly, bi-weekly, and monthly. Nearly 10,000,000 copies of these papers are in circulation—or one daily and weekly paper to every third person in the whole population.

The production of paper for printing purposes has fully kept pace in America with the improvements in the printing machine. The annual value of the paper now produced is estimated at 17,500,000 dollars, or 3,500,000*l.*

Great improvements have recently been effected in the printed productions. It is not many years since American publications were of the commonest and coarsest quality, the sole object aimed at being cheapness. Specimens of the year 1835, and even of more recent date, will show that nothing could be worse than the quality of the paper, the character of the typography, and the nature of the binding of books in the United States. They would not, at that date, bear any comparison with even the common form of novels then produced in England, which were very indifferent. But all this has undergone a complete change, and their books of all kinds will now bear comparison with, if not in some respects excel, English publications of the same class. The American newspapers are, however, very inferior, both as regards paper and printing, to the better class of journals published in the United Kingdom. Printing in the United States is very largely done by female compositors. In New York one in six of the average number employed are women and girls. To a certain extent this is due to the use of machines for setting and distributing the types, which are almost entirely ignored in Europe. In consequence of the absence of any copyright treaty between the United States and other countries, European standard works (but more especially English) are produced at very cheap rates, the publishers having to pay for nothing but materials and labour. Hitherto the Americans have always resisted any change in this respect, but such a system is so manifestly unsatisfactory, and unfair to foreign authors, that it can hardly be allowed to continue much longer.

The sewing-machine is another instrument for which the world is entirely indebted to American ingenuity and enterprise; and which, already, within the space of ten years, has universally recommended itself. The manufacture of these machines has become one of considerable magnitude since 1850. In the year 1860, 116,330 were made, the estimated value of which exceeded 5,600,000 dollars.

One very remarkable result appears to have followed the introduction of the sewing-machine into America. Twenty years ago nearly all the clothing worn in the country was imported; and, indeed, judging from the export of "apparel and slops" to the United States from England, valued at nearly a million and a half per annum, a considerable proportion of ready-made clothes are still sent to New York from the east end of London. Nothing, at one time, was more expensive than clothing, especially cloth clothing, in the United States. But the sewing-machine, if it has not greatly moderated prices, has, at any rate, largely operated throughout the Union upon the production of articles of wearing apparel of almost every description (stockings, perhaps, excepted).

The engineering manufactures of the United States have also become of considerable magnitude. The majority, if not all, of the locomotive and stationary steam-engines, of the engines used in mines, factories, mills, forges, &c., are now made at home. A certain proportion of machinery is still imported, equal, perhaps, to about 50,000*l.* a year; but these machines are those only of the finer description. As before stated, in the manufacture of iron goods the United States do not appear to make such great progress as in some other branches of manufacturing industry. The value of the production of the iron foundries in 1860 was calculated at 27,970,193 dollars, or say 5,400,000*l.* But in that year the United States imported from Great Britain alone iron to the extent of 3,136,000*l.*; hardwares, 1,055,000*l.*; and iron in bars, 34,400*l.*; or, making allowances for the differences in prices and calculations on either side, a quantity probably not far short of her production. Many of the lighter articles of hardware are now manufactured to great advantage; but most iron goods, and especially those of the heavier descriptions, England can supply very much cheaper at present than the Americans can produce them; and this especially applies to railroad iron, which must inevitably form, for many years to come, so large a proportion of the iron used in the United States.

A quarter of a century ago the Americans were large importers of all sorts of manufactured leather articles, and especially of boots and shoes, but they now not only manufacture their own leather, but make all their own boots and shoes; and, indeed, export them to the extent of little less than a million and a half of dollars a year. The tanning and currying establishments of the United States produced leather in 1860 to the extent of 63,000,000 dollars (12,600,000*l.*). The value of the boots and shoes manufactured from this leather, amounted to nearly 90,000,000 dollars (18,000,000*l.*). This branch of trade nearly doubled itself between 1850 and 1860 in the New England and western states. It has attained its popularity and success entirely by the employment of machinery, which is now used in every department. The manufacture of shoes and boots is

chiefly carried on in large mills, some of which are worked by steam power, and employ large numbers of hands. Five establishments belonging to the same proprietors in Massachusetts produced in 1860 over a million pairs of boots and shoes, valued at 1,300,000 dollars, or an average of about 5*s.* 6*d.* per pair.

India-rubber goods are also an important branch of American industry. They are chiefly made in the states of New York, New Jersey, Connecticut, and Massachusetts; and in 1860 the trade was calculated to produce goods to the value of 5,799,900 dollars, or 1,145,920*l.* per annum. There are about thirty establishments engaged in the manufacture, and nearly 3000 hands are employed in it. At one period a very large amount of these goods was sent to England from America, but this has now ceased, in consequence of the development of the trade in Great Britain.

Soap and candles are made in the United States in large quantities, the value of the product in 1860 being 17,000,000 dollars.

Another important business which the people of the United States are now doing for themselves is that of making cabinet furniture. The furniture produced in 1860 was valued at 22,701,000 dollars (4,540,000*l.*). America, which used to import so largely of these articles, has not only ceased to do so to any extent, but actually exports much more largely than she imports them. The cabinet furniture manufactured is for the most part plain, but with the growth of wealth and luxury it will, no doubt, assume a more costly character. Some of the houses in New York and other principal cities are as elegantly furnished, and as elaborately decorated, as any in England.

Such large numbers of American clocks have been brought over to Europe as entirely to have superseded the Dutch clocks, which in former days were in such general use in England. The American clock exemplifies the general character of the mechanism of the people—their 'mission' to invent inexpensive machines of general applicability and utility. A watch manufacturing trade, commenced within the last few years at Boston, has proved eminently successful, and has spread so rapidly as to make watches quite an item in the list of American productions. Jewellery presents a large item in the list of the manufactures of the country. Not only do the Americans manufacture their own silver, plated, and Britannia ware, but also their own jewellery, and carry on the business very largely in New York, New Jersey, Pennsylvania, Rhode Island, and Massachusetts. The rapid growth of wealth, and the demand for articles of luxury, have greatly stimulated this trade; and the use of cheap jewellery, facilitated by the improvements in electro-metallurgy, appears much to have assisted its development. About 16,000,000 dollars worth of silver plate and jewellery (exclusive of watches and watch cases) was manufactured in the United States in 1860; and although the patterns seem generally to be adapted from those most in request in London and Paris, yet the workmanship does not appear to be inferior to that of the general run of jewellery in either city. The manufacture of musical instruments employs a considerable number of mechanics, especially in New York.

Spirituous liquors are also largely and increasingly produced; but it will probably be admitted that this is not to be regarded with unmingled satisfaction. In 1864 the quantity was 88,000,000 gallons of spirits, principally whisky, 'high wines,' and alcohol, from 1138 distilleries, chiefly in the middle and western states. Where corn of every sort is so abundant, it is obvious

that the opportunity of manufacturing spirituous liquors must be excessive; but it is not desirable, except, it may be, for purposes of revenue, to stimulate this production.

Eighty-eight millions of gallons of spirits in one year, for a population of 32,000,000 of people, would seem to be a very excessive produce.* In Great Britain the number of gallons charged with duty in 1860 was only 20,000,000 gallons; and that was sufficient to produce a revenue of nearly 10,000,000*l.* per annum. The product of distillation in America is of a low class, but this makes it all the worse.

The various and enticing modes in which spirits are drunk in the United States are not to be overlooked. The most ardent advocate of temperance cannot be indifferent to the forms in which 'cocktails,' 'juleps,' 'slings,' and 'twists,' are presented, whether as summer or as winter beverages. All this, however, only makes the general result the more unsatisfactory. The Americans are by no means an intemperate people, but they are induced to consume very large quantities of highly intemperate liquids under an engaging form.

Malt liquors have been introduced into the United States chiefly to suit the palates of the Germans, who form so considerable a proportion of the population. The number of brewing establishments in 1860 was 970, and they produced 3,239,000 barrels of beer. This was a larger proportionate increase of consumption even than in the case of spirits. It would probably be larger still if the beer brewed was superior in quality and cheaper in price; but the malt productions are, for the most part, dear and bad.

Though it scarcely comes under the head of a manufacture, ice is one of the most valuable articles in the States. Not only do they consume an immense quantity themselves, but it has also been reserved for the Americans to show the extent to which it can be carried as an article of commerce. They export it largely to all the southern ports of the Union, and also to the Spanish Main, South America, the West Indies, the East Indies, China, and Japan. Numerous companies and large numbers of vessels are engaged in the trade. The ice is taken from fresh-water ponds situated at a great elevation above the sea. It is usually cut into blocks of about a foot thick, and is beautifully transparent and free from air cells. It is conveyed from the lakes to store-houses by railway carriage. The storage and export is managed in such a way as to avoid waste, and the ice usually arrives at its destination in almost as solid a condition as when it was cut from its native pond.

Fisheries.—The fisheries of the United States are of great value, and in 1860 employed a capital of 18,000,000 dollars. Notwithstanding the extraordinary temptations to engage in agriculture, afforded by the cheapness and facility of obtaining land, the Americans have from the earliest period been distinguished for their skill in fisheries and navigation, and by the vigour and success with which they have pursued those branches of industry. They commenced the whale fishery as early as 1690, and for about fifty years found an ample supply of fish on their own shores; but the whale having then abandoned them, the American navigators entered with extraordinary ardour into the fisheries

* The quantity produced in 1864 was considerably in excess of the average, in consequence of an anticipated increase of duty; but the average consumption of spirits in the United States is more than double the whole quantity produced in Great Britain and Ireland.

carried on in the Northern and Southern Oceans. In 1866 the States had 311 vessels, with an aggregate tonnage of 73,289, and owned chiefly in New England, engaged in this fishery. The catch yielded about 85,000 barrels of oil. The other principal sea fisheries are those of the cod and mackerel, both of which are carried on with great vigour, and afford employment for about 170,000 tons of shipping. The total number of hands employed in all the fisheries of the United States is over 30,000, and the estimated annual produce is valued at about 15,000,000 dollars.

Shipping.—The people of the United States derive a great advantage from the extent and nature of their sea-board. Their whole Atlantic coast line from Maine to Florida presents an infinite variety of bays, inlets, river entrances, and harbours. Many of them are capable of accommodating the largest class of vessels. In the whole world there are comparatively few ports which a ship having so great a draught of water as the *Great Eastern* is able to enter, or in which she can lie securely. But she can not only enter the Bay of New York, but can lie close up to the very shore of the city. On the south, the Americans have also a number of fine harbours in the Gulf of Mexico; and their Pacific coast line, though not so well indented as that of the Atlantic, affords, in addition to the great bay of San Francisco, several excellent resorts for shipping, especially in the Columbia River in Oregon, and in Puget's Sound. Nor can it be said that even on their northern boundary they are without a coast line; for the great lakes which form that boundary afford an extent of navigation almost equal to that of an ocean, and are navigated by sailing craft and steamers to an extent but little inferior to that of the sea-board itself.

In addition to their coast lines, lakes, and shores, the country has the great advantage of being permeated by a number of most important navigable rivers. The state of Maine is traversed by the Kennebec; Vermont, New Hampshire, Massachusetts, and Connecticut by the Connecticut River; New York by the Hudson and its branches; Pennsylvania by the Delaware and Schulkyl; Maryland by the Susquehana; all flowing from west to east. All the southern states, except Florida, which, with a double coast line, scarcely requires inland navigation, have rivers which are navigable for larger or smaller craft. Nor is this great advantage confined to the northern or southern states. The great river Mississippi permeates the very centre of the continent of America, and by means of a canal from the Mississippi to Chicago, which permits the passage of large shipping, absolutely carries the produce of the northern lakes directly to the Gulf of Mexico. The Mississippi, in its course to the ocean, of itself affords navigation to no less than ten great states—Minnesota, Wisconsin, Iowa, Illinois, Missouri, Kentucky, Arkansas, Tennessee, Mississippi, and Louisiana. Its branches, the Missouri River, the Platte, the Ohio, the Wabash, the Arkansas River, the Red River, and others, afford opportunities for navigation even into the most distant regions and territories. The inland navigation of America is indeed quite as important as its coast line: for by it the very heart of the continent is reached, and vast fields of produce are brought into direct communication with the sea-board and the ports of export, and it is something for the people of the United States to boast of that the whole of these waters are navigated by vessels of their own construction.

The *progressive* increase of the mercantile shipping of America is exhibited by the following figures, which show the tonnage of the 'registered' sailing ships, the 'enrolled and licensed' steamers, and the 'total tonnage' for some years:—

Year.	Registered Sail Tonnage.	Enrolled and Licensed Steam Tonnage.	Total Tonnage.
1845	1,988,680	319,527	2,417,002
1846	1,123,909	341,006	2,362,084
1847	1,255,682	360,210	2,839,046
1848	1,344,819	411,833	3,154,042
1849	1,418,072	451,325	3,334,016
1850	1,540,769	481,005	3,333,454
1851	1,663,917	521,217	3,772,439
1852	1,819,744	563,534	4,138,440
1853	2,013,154	574,098	4,407,010
1854	2,238,783	581,571	5,802,902
1855	2,440,091	655,240	5,212,001
1856*	2,401,687	583,362	4,871,632
1857	2,377,094	618,911	4,940,842
1858	2,489,742	651,363	5,049,808
1859	2,414,654	676,005	5,145,038
1860	2,448,941	770,641	5,353,868
1861†	2,540,020	774,596	5,539,813
1866	—	—	4,310,778

* In 1856 all vessels sold to foreigners, lost, or condemned, in *previous* years, were struck out of the Register, which reduced the aggregate tonnage by upwards of 680,000 tons.

† In consequence of the civil war, during which many American vessels were transferred to other nations, the figures between 1861 and 1866 afford no fair criterion of the state of the shipping interest, and we have therefore not given them.

The 'Registered Sail Tonnage,' as given in the first of the foregoing columns, shows pretty fairly the annual increase in the tonnage of the country engaged in *foreign* trade. The 'Enrolled and Licensed Steam Tonnage' indicates the progress made by the Americans in the navigation of their *inland* waters. To form an estimate of their coasting trade and canal navigation, we must take the 'Enrolled and Licensed Sail Tonnage,' which increased from 1,002,000 tons in 1845 to 2,036,000 tons in 1860. The 'total tonnage' of the United States in 1845 was returned at 2,417,000, and in 1860, at 5,353,868 tons; so that in the interval it was considerably more than doubled. During the civil war, as is well known, the marine of the republic of the United States suffered very severely; so much so that the returns for 1864 showed upwards of *a million* less registered sailing tonnage than in 1860. This decrease was, however, only in a small degree owing to captures. It arose mostly from the sales and transfers which American shipowners made of their property during the war, in order to avoid seizure.

The larger proportion of American vessels are what are denominated 'small craft' in Great Britain. They have, however, gradually enlarged the size of their sea-going ships, and have constructed them from finer models. Their sailing vessels are also of highly increased sailing power, and no people build their ships on better principles.

Commerce.—The commerce of the British colonies, which afterwards formed the United States, early attained a considerable magnitude. In 1700 the exports of New England, New York, Pennsylvania, Virginia, Maryland, and Carolina amounted to about 395,000*l.*, and their imports to 344,000*l.* In 1750 the exports of these colonies had risen to 813,000*l.*, and their imports to 1,312,000*l.* In 1775 the exports were 1,920,000*l.*, while the imports, which in the previous year (1774) were 2,692,000*l.*, fell off under the prospect of the coming war to 196,000*l.*, and in 1776 to 55,400*l.* During the war, and until the adoption of the constitution,

trade languished, and commerce was to a considerable extent suspended, owing to the jealousies of foreign states, and the rivalry of the several members of the confederation. After the re-organization of the government under the constitution in 1789, it speedily attained respectable proportions. The tonnage, which in 1792 was 564,437, had increased in 1801 to 1,033,219; the imports, which in 1792 were 31,500,000 dollars, were 111,363,511 dollars in 1801; and the exports had risen during the same period from 20,753,098 dollars to 94,115,925 dollars. In 1807 the tonnage was 1,268,548, the imports 138,500,000 dollars, and the exports 108,343,150 dollars. At this point American commerce received a blow from which it did not recover for years. The 'orders in council' of the British Parliament, followed as they were by the 'Berlin and Milan decrees' of Napoleon, and by their own Embargo Act in 1807, produced a terrible stagnation in the United States commerce; and though the amount of tonnage did not vary materially for the next fifteen years, the imports fell off in 1808 to 56,990,000 dollars, and the exports to 22,430,960 dollars. The war of 1812–15 furnished employment to some of the vessels which would otherwise have rotted at their wharfs, and led to the building of some war vessels and fast-sailing privateers; but the commerce of the country continued to decline, till in 1814 it had fallen to 12,965,000 dollars, imports, and 6,927,441 dollars, exports. The close of the war gave an extraordinary impulse to trade, and in 1815 the imports reached 113,041,274 dollars, while in 1816 they rose to 147,103,000 dollars; the exports of these two years were 52,557,753 dollars and 81,820,452 dollars. From this amount, which was excessive for the wants of the country at the time, there was a falling off the next year to 99,250,000 dollars; and from that period to 1830, with the exception of 1818, the average of imports did not exceed 78,000,000 dollars, and the exports were of about the same amount. From 1831 to 1837 the imports and exports rapidly increased, the former being 189,980,035 dollars in 1836, and the latter 128,663,040 dollars. The revulsion of 1837, and the combined results of the bankrupt law, the change in the tariff, and the secondary effects of the great financial panic, reduced both imports and exports, which touched their lowest point in 1842. From just after that date, as will be seen by the annexed table, the increase was gradual at first; but more rapid in the later years, up to 1860, when the exports were 400,122,296 dollars, and the imports 362,163,941, or together, about 152,000,000*l.* sterling. This was an inferior trade to that of the United Kingdom, which, in the same year, conducted an import and export business amounting to 375,000,000*l.* sterling; a trade which has since been so much increased as to exceed 500,000,000*l.* sterling. But, except France, there is no other country which approaches the United States in the value of its trade. A very remarkable circumstance is this, having regard to the ages of the nations. The trade of Europe has been the growth of centuries: that of the United States is the growth of less than eighty years, and it already surpasses the trade of every nation but that of the United Kingdom. Of course it is not difficult to account for this extraordinary increase. Apart from the industry and energy of the Americans, their enormous territory and its immense resources, as yet but partially developed, would fully explain it.

The following table gives the value of the imports and exports from 1844 to 1866. In the latter year both were larger than they had ever been before:—

IMPORTS AND EXPORTS OF THE UNITED STATES.

Year.	Imports.	Exports.
	Dollars.	Dollars.
1844	108,435,035	111,200,046
1845	117,254,564	114,646,606
1846	121,691,797	113,488,516
1847	146,545,638	158,648,622
1848	154,998,928	154,032,131
1849	147,851,439	145,755,820
1850	178,138,318	151,898,720
1851	216,224,932	218,388,011
1852	212,945,442	209,658,366
1853	167,978,647	230,976,157
1854	304,562,381	278,241,064
1855	261,468,520	275,156,846
1856	314,639,942	326,964,908
1857	360,890,141	362,960,682
1858	282,613,150	324,644,421
1859	338,765,130	356,789,462
1860	362,163,941	400,122,296*
1866	565,426,394	437,640,354

* It is quite useless to attempt to give the statistics of the imports and exports of the United States between 1860 and 1866. In consequence of the excessive fluctuations in the values of money during that interval, the declared and estimated values of articles imported and exported were so singularly affected, that no reliable conclusions can be drawn from them. We have, therefore, thought it better to set aside the commercial statistics during the years of the civil war as only calculated to occasion misconception.

There are two points in this table which are very significant; first, that the trade of the United States during the last twenty years has been *regularly* and *steadily* progressive; second, that the nation has uniformly paid its way: the exports, in almost every year, having exceeded the imports, and the general balance being in favour of America.

The great increase in the exports in 1851 was attributable to the discovery of gold in California, and since that time the export of bullion has ranged between 50,000,000 and 60,000,000 dollars per annum; but what is even more important is, that during the above period almost every item of native produce exported rose in nearly the same proportion as gold:—

PRODUCTS OF THE UNITED STATES EXPORTED IN SEVERAL YEARS.

Products of	1847.	1850.	1855.	1860.
	Dollars.	Dollars.	Dollars.	Dollars.
The Sea, . . .	3,468,033	2,824,818	3,516,894	4,156,480
The Forest, .	5,996,073	7,442,503	12,603,837	13,738,500
Agriculture, .	68,450,383	26,547,158	42,567,476	*48,454,894
Tobacco, . . .	7,242,086	9,951,023	14,712,468	15,906,547
Cotton, . . .	53,415,848	112,315,317	88,143,844	191,806,555
Manufactures, .	10,476,345	20,136,967	28,833,299	30,803,080
Raw Produce, .	1,526,076	1,437,680	2,373,317	2,279,308
Specie & Bull.,	62,620	18,069,580	53,957,418	56,946,851

* The export of grain, as is generally known, depends materially, not upon the produce of the country, but upon the state of the crops in other regions of the globe. It amounted to 77,000,000 dollars in 1856. In 1860 the exports of the products of agriculture were low; but in 1861 they rose to 101,655,000 dollars, and in 1862 to no less than 124,561,000 dollars, or nearly 25,000,000*l.* sterling.

The exports of products of the sea consist of oil, whalebone, spermaceti, and dried, smoked, and pickled fish; of the forest, of every description of timber, shingles, staves, lumber, naval stores, and furs; of agriculture, not only of nearly every description of corn and vegetable food, but of the products of animals, beef, pork, tallow, hides, bacon, cheese, butter, wool, lard, and hams.

The twelve countries with which America trades most extensively, and the relative importance of the commerce with each, is shown in the annexed table, which gives the exports for a recent year:—

Countries.	Value of Exports. Dollars.
Great Britain,	105,898,554
France,	26,014,181
British North America,	18,652,012
Hamburg and Bremen,	12,672,646
Spanish West Indies,	10,626,642
British West Indies,	6,928,527
China and Japan,	4,328,506
Brazil,	3,748,249
British East Indies and Australia,	3,520,663
Holland and her Possessions,	3,237,022
Belgium,	3,192,691
Hayti and San Domingo,	3,088,108

The total value of the exports to all countries in this year was 213,069,512 dollars, so that it will be seen that not less than one-half of the whole export trade of the United States is to Great Britain; and that her third largest trade is with British North America.

According to the trade and navigation returns of the United Kingdom, the following was the intercourse of commerce between the two countries during the years 1854 to 1866:—

Years.	Exports from the United States to the United Kingdom.	Imports from the United Kingdom into the United States.
	£	£
1854	29,795,302	22,333,403
1855	25,741,752	18,062,603
1856	36,047,773	22,616,877
1857	33,647,227	20,076,895
1858	34,257,515	15,793,701
1859	34,294,042	24,417,892
1860	44,727,202	22,907,681
1861	49,389,584	11,025,683
1862	27,715,157	19,173,907
1863	19,572,010	19,696,785
1864	17,923,648	20,183,566
1865	21,624,125	25,170,787
1866	46,854,503	31,843,836

The following comprised all the articles of import and export, in 1866, the value of which amounted to 100,000*l.* and upwards:—

EXPORTS FROM THE UNITED STATES TO THE UNITED KINGDOM.

Articles.		Quantities.	Computed Real Value.
			£
Bacon,	Cwts.	347,221	940,012
Beef, salted,	"	143,260	324,081
Cheese,	"	415,726	1,386,440
Corn: wheat,	"	635,239	375,029
" barley,	"	346,527	177,444
" oats,	"	382,136	155,319
" maize, or Indian corn,	"	6,953,811	2,188,219
" wheatmeal and flour,	"	280,792	209,951
Cotton, raw,	"	4,643,370	34,977,986
Iron and Steel, wrought or manufactured,	Value	—	111,578
Lard,	Cwts.	97,011	334,668
Oil, spermaceti, or Head Matter,	Tuns	1,700	210,416
Naphtha,	Gallons	981,037	138,980
Oil-seed cake,	Tons	40,314	419,310
Petroleum,	Tuns	29,633	676,006

Exports continued.

Articles.		Quantities.	Computed Real Value.
			£
Pork, salted,	Cwts.	47,444	118,411
Rosin,	"	346,308	271,376
Seed, Clover,	"	46,136	146,011
Tallow,	"	138,099	327,159
Tobacco, unmanufactured,	Lbs.	29,320,894	997,115
Wood and timber: Not sawn or split,	Loads	39,398	166,288
All other articles,	Value	—	2,202,704
Total,		—	46,854,503

IMPORTS INTO THE UNITED STATES FROM THE UNITED KINGDOM: PRODUCE AND MANUFACTURES OF THE UNITED KINGDOM.

Articles.		Quantities.	Declared Real Value.
			£
Alkali, soda,	Cwts.	1,783,243	995,530
Apparel and haberdashery,	Value	—	1,268,720
Bags, empty,	Dozens	234,540	116,801
Bleaching materials,	Cwts.	220,085	147,461
Books, printed,	"	14,922	176,183
Cottons, entered by the yard,	Yards	114,744,971	3,295,496
Cottons, entered at value,	Value	—	1,116,369
Drugs and chemical products,	"	—	202,037
Earthenware and porcelain,	"	—	790,568
Glass manufactures,	"	—	104,435
Hardwares and cutlery, unenumerated,	Cwts.	140,618	1,032,407
Iron, wrought and unwrought,	Tons	348,095	3,190,341
Lead and shot,	"	8,276	173,069
Leather, wrought and unwrought,	Value	—	140,574
Linens, entered by the yard,	Yards	119,442,507	4,171,989
" " at value,	Value	—	240,095
Machinery and millwork,	"	—	334,442
Oil, seed,	Gallons	2,330,697	364,594
Painters' colours,	Value	—	101,776
Paper of all sorts,	"	62,613	170,004
Salt,	Tons	161,277	101,618
Silk manufactures,	Value	—	367,128
Tinplates,	Value	—	1,434,055
Woollens, entered by the yard,	Yards	86,777,535	5,429,829
Woollens, entered at value,	Value	—	196,123
All other articles,	"	—	2,837,870
Total,		—	28,499,514

FOREIGN AND COLONIAL PRODUCE AND MANUFACTURES.

Articles.		Quantities.	Computed Real Value.
			£
Bacon,	Cwts.	58,080	170,609
Hemp, undressed,	"	87,808	148,380
Indigo,	"	4,010	119,214
Silk manufactures of Europe, unenumerated,	Value	—	157,385
Silk, raw,	Lbs.	237,911	316,223
Tea,	Lbs.	3,228,855	258,891
Wool, sheep and lambs',	Lbs.	4,519,704	280,723
All other articles,	Value	—	1,883,897
Total,		—	3,344,322
Total of British and Foreign produce,		—	31,843,836

The great bulk of the export trade of the United States is carried on from New York, New Orleans, Boston, Baltimore, Mobile, Charleston, and Philadelphia, in the order in which those cities are respectively named. The trade of San Francisco is, however, very rapidly developing itself. At the present time, the vessels which enter and clear at that port number no less than 1000 per annum, trading with every part of the Pacific, as well as with other portions of the world. With China especially, a very large trade is being developed from San Francisco. Flour, wheat, lumber, bacon, butter, cheese, lard, wine, and vegetables, are all exported to that country in increasing quantities. The Chinese who have settled themselves in California (in spite of the most determined efforts to exclude them on the part of a section of the population) have done great service in teaching their countrymen at home the use and value of Californian products, and in overcoming their ancient prejudices to 'barbarian' diet.

With regard to the imports into the United States of textile fabrics, piece goods of silk, wool, cotton, and linens, carpetings, hosieries, ribbons, and embroideries of all sorts, are the largest classes of goods. In metals, cutlery and railroad iron are the largest items; tin in plates and sheets, and lead in bars and sheets, following. China, porcelain, and stone-wares amount to a very considerable figure, and glass of every description, from polished plate-glass to watch-glasses, forms another large item. Champagne stands highest in the list of European wines; claret and other red wines (generally of low quality) representing a scarcely less inferior amount. Brandy is the only spirit introduced in any very considerable quantity. Amongst fruits, raisins are the largest item; and amongst spices, black pepper and pimento. Upon the whole, the Americans, judging from their imports, appear to have much the same tastes and requirements as the English.

Internal Trade.—Large as is the export and import trade of the United States, it is nothing in comparison with her internal commerce, which is very much facilitated by the perfect freedom of trade which exists between all the states and territories. The distances in America are so great, the region of production lies, in many cases, so far from the field of consumption, that the internal trade and traffic of the country must be necessarily a business, not only of vast importance in itself, but of importance enlarging with the rapid increase of population, the still more rapid development of the resources of the country, and the extended and extending field over which the population is spread, and from which those resources are drawn. In fact, the inland trade of the United States may be considered almost as various as that of Great Britain with her colonies. Mr. W. E. Baxter, M.P. for Dundee, in his most valuable book on America, remarks, 'It is astonishing to observe the vast quantities of produce in course of transit throughout the country. Huge steamboats on the Mississippi and Alabama are loaded to the water's edge with bales of cotton. Those on the Ohio are burdened with barrels of pork and thousands of hams. 'Propellers,' on the lakes, are filled with the finest wheat from Wisconsin and Michigan. Canal boats in New York and Pennsylvania are deeply laden with flour. Railroad waggons are filled with merchandise; and locomotives struggle, in the western wilds, to drag trains richly freighted with the productions of every country under the sun. The United States reminded me, sometimes, of a great ant-hill, where every member of the community is either busy carrying a burden along a beaten pathway, or hastening away in search of new stores to increase the national prosperity.'

Whilst the tide of emigration sets from east to west, the tide of commerce flows from west to east. The produce of the country, of whatever description, has all to be conveyed in that direction. Up to a comparatively recent period the river and lake navigation, and the canal navigation which has brought the lakes and rivers into connection, have supplied the principal facilities for internal trade. The large extent of the 'enrolled and licensed' sail tonnage of the United States has been previously referred to. This tonnage, together with the 'enrolled and licensed' *steam* tonnage, was computed, in 1860, at nearly 3,000,000 tons. This may be taken as the amount of tonnage, of every description, employed in the internal trade of America, including, of course, the river, lake, canal, and coasting navigation. Such an amount of tonnage shows an immense internal traffic, but it has not kept pace with the population and progress of the country; and looking to the fact that during a considerable portion of the year the canals are frozen up, and the navigation of the lakes and rivers of North America similarly interrupted, and regarding also the circumstance that during the entire year the single track lines of the American railways are choked with traffic, it will be readily understood that the provision at present existing for the conduct of the great bulk of the internal trade of the United States is exceedingly inadequate. A development of the railroad system alone can be looked for to cure this defect.

The articles chiefly carried westward in America are groceries, including sugar and molasses, dry goods, hardwares, empty barrels (to contain oil, and also for packing flour), machinery and castings, soda, pearl and potash, earthenware, boots, shoes, and hats, copper, tin, and lead, drugs, medicines, and dyes, furniture and oilcloth, crockery, green and dried fruits, rolled iron, hemp and cordage, brown sheeting and bagging, marble, cement, lime and plaster, paper, rags and stationery, oysters, nails and spikes, salted meats and fish, tobacco and cigars, and carriages and waggons. The eastward freight consists for the most part of agricultural products, cotton, corn, flour, seeds, live stock, butter and eggs, poultry, pork, beef, and other meats (both fresh and salted), lard and tallow, manure, lumber, malt, petroleum, hides, lead, raw tobacco, and wool and woollen yarn.

Railroads.—Railroads in the United States may be said to be contemporaneous with those in England. Before steam power was applied to railway lines in that country, iron tracks, on which vehicles were drawn by horse-power, were in use from granite and coal quarries to ports of debarkation. In Quincey, Massachusetts, one of these, terminating at the quarries with a self-acting inclined plane, was begun in 1826 and opened in 1827, and in the latter year similar lines were constructed in Pennsylvania. They were, however, very imperfect. The first locomotive which was ever seen in America was imported from Mr. Stephenson's factory at Newcastle-upon-Tyne, in 1829, and was for some time exhibited as a curiosity in New York. The first locomotive engine used in the States was constructed by Messrs. Foster, Rastrick, & Co., of Stourbridge, in the latter part of the same year. In 1830, no doubt from these models, a locomotive engine was made in New York by the Americans themselves.

Of the more considerable railway enterprises of the country, the first was a portion of the now Baltimore and

Ohio Railroad, which was opened in 1830. Although the traffic was great, an engine appears to have been only partially worked, the trains having also been moved by horses.

In 1830 the Hudson and Mohawk Railroad, from Albany to Schenectady, was commenced, and in 1832 a locomotive with a load of 8 tons travelled on it at the rate of 30 miles an hour. In 1831 twelve different railroad companies were incorporated; and from this time railroad enterprizes were rapidly multiplied.

From the first the American people favoured railroad construction, and afforded every possible facility for it. In fact every one there felt at once what every Englishman has experienced at last, that the construction of a railroad through his property, or to the city, town, or village he inhabited, was a source of prosperity and wealth, not only to the district in which he resided, but to himself personally. Thus, as a rule, nothing has been easier than to obtain from the legislative authority of a state in America a concession, or as it is there styled, a 'charter,' to lay down a road. The land in many cases, especially where it belonged to the public, has been freely given for the line; in other cases, where landed proprietors were affected, comparatively small compensations have sufficed to satisfy their claims. Under certain regulations, lines have been permitted to be laid down in the main streets and thoroughfares of the cities, so that the trains may traverse them at prescribed speeds, and so that goods may be put upon trucks at the very doors of the warehouses and shops.

The outlay upon the American lines has been from 8700*l.* up to 15,000*l.* per mile, whilst the average cost in Great Britain has been nearly 40,000*l.* per mile. In this estimate of cost we have, of course, to consider the relative character of the lines. The American lines are almost invariably single, whilst the English railroads are mostly double lines. In other respects the American railroads are, as a rule, very inferior to the English. Their earthworks are, for the most part, of a very simple character. In fact, from the generally level surfaces through which they are made (in the prairie districts especially), little has been done but to lay out the track. The timber for the sleepers has been obtained from the roadside, or from the woods in the immediate neighbourhood. The supply has usually been abundant: and it has immensely contributed to the economic construction of the road, enabling the constructors to lay down sleepers at much more frequent intervals than is usually done in Europe. The rails have been usually obtained from England, Wales, or Scotland, and in many cases the price of the iron has formed, in America, the largest proportion of the cost of the construction of the lines. The rails are generally too light.

With regard to some other points of American railroad construction, no comparison can be instituted between the arrangements on the other side of the Atlantic and those which prevail in Great Britain. There are scarcely any artificial drains. The ballasting of their lines is often very imperfect; indeed it has not been thought necessary generally to ballast a line at all until after it has been opened, and the consequence, it need scarcely be said, has been very imperfect working and serious detriment to the rails until the road-bed is drained and the ballast is complete. The railway stations in America are also very inferior, being for the most part mere wooden erections of a temporary character. On the more important lines, however, the stations are gradually being rebuilt substantially, and in every respect suitably, from the income of the road.

There is very little tunnelling on the American railways, and most of the bridges and viaducts are constructed on wooden piling in a very inexpensive manner.

The progress of railways in America has been rapid. The following table will show the number of miles completed in periods of two years, from 1838 to 1860:—

RAILROAD MILEAGE IN THE UNITED STATES.

Year.	Miles.	Year.	Miles.
1838, ...	1,843	1850, ...	8,827
1840, ...	2,167	1852, ...	12,841
1842, ...	3,863	1854, ...	19,195
1844, ...	4,285	1856, ...	23,724
1846, ...	4,823	1858, ...	27,158
1848, ...	6,491	1860, ...	31,185

The capital invested in these 31,000 miles of railway was 1,777,994,828 dollars, or about 235,000,000*l.*

As before stated, the railways in America are almost universally *single track* lines, and this fact has to be regarded in estimating the amount of railroad accommodation provided for the United States in comparison with that of other countries. It is a common thing to hear the American railroads spoken of as exceeding in length those of all the rest of the world put together. But those who speak in this way do not appear conscious of the fact that the greater bulk of the English and French lines are double; and that when it is said, for example, in England, of 10,500 miles of railway open in 1860, that estimate of mileage does not include duplicate, and even in some cases triplicate, lines of communication.

Most of the American lines were originally made in short lengths, as lines of communication between different towns in the same state; and without regard to any general system of communication for the nation. It follows, that even in the cases of lines which are now united and brought under a single management, much diversity of construction and great want of unity of system is observable. One of the great deficiencies of the American railroad system is, in fact, the absence of a general policy of management. Scarcely any attempts are made to render the service of lines convenient to travellers by working the trains of one company in conjunction with another; and this gives rise to great complaints on the part of the public.

In many parts of the United States, the existing railways are quite insufficient. In the south the system is very imperfectly developed. Whilst slaves existed, there was a determined hostility in the southern states to the expansion of any general railway system, arising from the apprehension that it would be used for the escape of slaves. Thus whilst the northern states are covered with lines, the southern have only a few main trunk roads; and before the abolition of slavery the greatest care was taken to prevent those lines from communicating with the free states. From west to east, also, the present railways are quite insufficient for the growing traffic. The lines of communication from the west by canal, &c., which existed previously to railways, have not been affected by their construction. The produce of the western states has, in fact, increased faster than the means of transport, and additional facilities for the conveyance of goods are urgently required.

The cost of working the American lines is considerably more than double that in England, being at the rate of nearly 72*d.* or 6*s.* per train mile, against 31*d.* or 2*s.* 7*d.* This is chiefly caused by the imperfect way in which the American lines were first made, and, consequently, the great tear and wear on them, and partly by the high price of labour.

The average earnings of the six largest railways in

America in 1865, were 109·4 pence per train mile: in England the receipts on the six largest lines were only 64·3 pence per train mile. The American lines, therefore, were able to bear a larger proportion of cost of working than the English ones; and the dividends of American companies cannot be generally considered unsatisfactory. From a table compiled from the New York Share Lists, of the financial details of all the dividend-paying railroad companies of the United States during 1865, it appears that the Camden and Amboy paid 35 per cent., some Ohio and Pennsylvania lines 25 to 30 per cent., and many others 20, 19, 18, 16, 15, 14, 12, 11, and 10 per cent. Only four on the list paid less than 5 per cent., and only one of those is of any importance. Despite every drawback, therefore, the first-class American railroads are good investments.

The rates in America are generally low, both for passengers and goods. The New York Central, perhaps one of the most important of the American lines, is restricted by law to a charge at the rate of *two cents*, or 1*d*., per passenger per mile. This is a most successful railroad, paying a steady dividend of 9 per cent.: yet the company assert that the rate for passengers involves a loss instead of a gain, and the legislature has been appealed to for authority to increase it. It is also said that American railroads would make much larger profits were they to adopt a system of 'second-class' cars; thereby affording travellers the opportunity of consulting their convenience and their pockets, by travelling either expensively or cheaply as they thought proper. The present car system is bad, both for the public and the companies, in an economic point of view. Uniformity of class means uniformity of rate: and whilst some American companies are precluded under the powers of their charters from accepting what the more opulent class of travellers would willingly pay for superior accommodation, they must of necessity keep up the price to the more needy classes, who would be quite ready to set diminished charges against moderate comfort and any supposed admission of social inferiority involved in travelling in a cheaper class.

The great distances over which it is necessary for Americans to travel has induced more attention on the part of the railway administration to the conveniences for long journeys, than is found in England. For instance, the chief American lines have attached to their night trains 'sleeping cars;' which are so arranged that while serving the purpose of a comfortable railway carriage in the daytime, they can at night be converted into as comfortable sleeping chambers. Good beds are made up by the train attendant, and the occupants can traverse from 160 to 240 miles of their journey insensible to all the inconveniences of a night journey. Washing-rooms and other essentials of a long journey are also provided in the 'sleeping cars,' so that the passengers can make their toilet independent of the stoppages of the train. All this valuable additional accommodation is furnished for a small extra payment of from 5*s*. to 7*s*. 6*d*. for the journey.

High speeds are not generally in favour on American lines; indeed, as a rule their condition does not admit of them. The rates of the express trains between New York and Boston do not exceed 29½ miles per hour, which is about the average of the leading lines. As regards loads, their goods trains (or freight trains, as they are called in America) are, as a rule, heavier than those in England; but they are drawn generally by lighter engines, which accounts for the deficiency of speed. Although the Americans are great travellers, there are no such things as 'Excursion Trains,' or at any rate they are very rare.

Telegraphs.—About the year 1832 Professor S. F. B. Morse first conceived the idea of an electro-magnetic telegraph, and in 1844 he erected, between Washington and Baltimore, a distance of about 40 miles, the first line established in the United States or in the world. This line was extended northward through Philadelphia and New York to Boston in 1845. The telegraphic wires now in operation form a network over the length and breadth of the land, from the Great Lakes to the Gulf of Mexico, and from the Atlantic to the shores of the Pacific. They also connect with the telegraph wires in the British provinces, where they have received a remarkable development, and are now extended from Prince Edward's Island to St. John, in Newfoundland, the most eastern point of America, and thence, by means of two submarine cables, with Great Britain and the rest of Europe. Two unsuccessful attempts were made to accomplish the latter object, but it was successfully carried out in 1866. The lines extend from Valentia, on the W. coast of Ireland, to Heart's Content Cove, in Trinity Bay, Newfoundland. At the present time (1868) the total length of the telegraphic wires in the United States is estimated at 58,000 miles, erected at a cost of about 160 dollars per mile.

Post-Office.—The postal arrangements in the United States, although very good for a new country, and in the course of rapid development, cannot yet be compared with those of the United Kingdom. In the whole of the states there are rather over 30,000 offices. The revenue of the department for the year 1866, was 14,386,986 dollars, and the expenditure 15,352,079 dollars, showing an excess of the latter of 965,093 dollars. Including the standing appropriation of 700,000 dollars, paid by the government for free mail matter, the actual deficiency was only 265,093 dollars. The decrease of revenue compared with the previous year amounted to 1½ per cent., and the increase of expenditure, owing principally to the enlargement of the mail service in the south, was 12 per cent. There are in operation 7000 mail routes, with an aggregate length of 180,000 miles, an annual transportation of 72,000,000 miles, and an annual cost, including all expenditures, of 8,410,184 dollars. The length of the railroad routes is 32,092 miles, and the annual transportation 30,609,467 miles. The length of steamboat routes is 14,346 miles, and the annual transportation 3,411,962 miles. The system of uniformity of postage is carried out in the United States—a letter being sent to any part for three cents (1½*d*.). The enormous distance which the mails have to travel, the vast amount of territory which is still waste, and the paucity of towns have hitherto always caused the post-office expenditure to be greater than its income, but, as will be seen above, they are now nearly approaching each other. The franking system is in existence and can be exercised by members of Congress and others, but its privileges have recently been curtailed, and there has been a corresponding gain to the revenue. The English money-order system has recently been introduced into the States with beneficial and satisfactory results. In 1868 the postage of letters between Great Britain and the United States was reduced from 1*s*. to 6*d*. per letter.

Money, Weights, and Measures.—The money, weights, and measures of the United States are—the dollar (average rate of exchange, 4*s*. 2*d*.); the half-eagle, five dollars; the eagle, ten dollars; the double eagle, twenty dollars. There are also half and quarter

dollars; dimes, or ten cents; half-dimes; and the nickel cent or 100th part of a dollar. The old English weights and measures are used, with the exception that a quintal of 100 lbs. is generally employed instead of a cwt. But, in the United States as in England, the introduction of a decimal system is recommended by scientific men.

Population and Immigration.—The following table shows the rapid increase in the population of the United States during the present century:—

States and Territories.	Area in sq. miles.	Population in 1810.	Population in 1820.	Population in 1830.	Population in 1840.	Population in 1850.	Population in 1860.			
							Whites.	Free Col'd.	Slaves.*	Total.
Maine,	31,760	228,705	298,335	399,455	501,793	583,169	626,947	1,327	—	628,279
New Hampshire,	9,280	214,360	244,161	269,328	284,574	317,976	325,579	494	—	326,073
Vermont,	10,212	217,713	235,764	280,679	291,948	314,120	314,369	708	—	315,098
Massachusetts,	7,800	472,040	523,287	610,408	737,699	994,514	1,221,432	9,602	—	1,231,066
Rhode Island,	1,306	77,031	83,059	97,199	108,830	147,545	170,649	3,952	—	174,620
Connecticut,	4,674	262,042	275,202	297,675	309,978	370,792	451,504	8,627	—	460,147
New York,	47,000	959,049	1,372,812	1,918,608	2,428,921	3,097,394	3,831,590	49,005	—	3,880,735
New Jersey,	8,320	245,555	277,575	320,823	373,306	489,555	646,699	25,318	—	672,017
Pennsylvania,	46,000	810,091	1,049,458	1,348,233	1,724,033	2,311,786	2,849,259	56,949	—	2,906,215
Delaware,	2,120	72,674	72,749	76,748	78,085	91,532	90,589	19,829	1,798	112,216
Maryland,	11,124	380,546	407,350	447,040	470,019	583,034	515,918	83,942	87,189	687,049
District of Columbia,	60	24,023	33,039	39,834	43,712	51,687	60,763	11,131	3,185	75,080
Virginia,	61,352	974,622	1,065,379	1,211,405	1,239,797	1,421,661	1,047,299	58,042	490,865	1,596,318
North Carolina,	50,704	555,500	638,829	737,987	753,419	869,039	629,942	30,463	331,059	992,622
South Carolina,	29,385	415,115	502,741	581,185	594,398	668,507	291,300	9,914	402,406	703,708
Georgia,	58,000	252,433	340,987	516,823	691,392	906,185	591,550	3,500	462,198	1,057,286
Florida,	59,268	—	—	34,730	54,477	87,445	77,747	932	61,745	140,424
Alabama,	50,722	—	127,901	309,527	590,756	771,623	526,271	2,690	435,080	964,201
Mississippi,	47,156	40,352	75,448	136,621	375,651	606,526	353,899	773	436,631	791,305
Louisiana,	41,255	76,556	153,407	215,739	352,411	517,762	357,456	18,647	331,726	708,002
Texas,	237,504	—	—	—	—	212,592	420,891	355	182,566	604,215
Arkansas,	52,198	—	14,273	30,388	97,574	209,897	324,143	144	111,115	435,450
Tennessee,	45,600	261,727	422,813	681,904	829,210	1,002,717	826,722	7,300	275,719	1,109,801
Kentucky,	37,680	406,511	564,317	687,917	779,828	982,405	919,484	10,684	225,483	1,155,684
Ohio,	39,964	230,760	581,434	937,903	1,519,467	1,980,329	2,302,808	36,673	—	2,339,511
Michigan,	56,243	4,762	8,896	31,639	212,267	397,654	736,142	6,799	* 6,172	749,113
Indiana,	33,809	24,520	147,178	343,031	685,866	988,416	1,338,710	11,428	* 190	1,350,428
Illinois,	55,405	12,282	55,211	157,445	476,183	851,470	1,704,291	7,628	* 22	1,711,901
Missouri,	67,380	20,845	66,586	140,445	383,702	682,044	1,063,489	3,572	114,931	1,182,012
Iowa,	50,914	—	—	—	43,112	192,214	673,779	1,069	* 65	674,913
Wisconsin,	53,924	—	—	—	30,945	305,391	773,693	1,171	* 1,017	775,881
California,	155,980	—	—	—	—	92,597	356,110	4,086	* 17,796	379,994
Kansas,	78,418	—	—	—	—	—	106,200	625	* 259	107,204
Nebraska,	75,000	—	—	—	—	—	28,696	67	* 63	28,826
Minnesota,	81,259	—	—	—	—	6,077	169,305	259	* 2,369	172,023
New Mexico,	124,500	—	—	—	—	61,547	82,924	85	* 10,507	93,516
Dakota,	240,000	—	—	—	—	—	2,576	—	* 2,291	4,867
Colorado,	106,475	—	—	—	—	—	34,231	46	—	34,277
Utah,	106,000	—	—	—	—	11,380	40,125	30	* 89	40,244
Oregon,	101,400	—	—	—	—	13,294	52,160	128	* 177	52,465
Nevada,	69,500	—	—	—	—	—	6,812	45	—	6,857
Washington,	70,000	—	—	—	—	—	11,138	30	* 426	11,594
Arizona,	121,000	—	—	—	—	—	—	—	—	—
Idaho,	90,000	—	—	—	—	—	—	—	—	—
Montana,	132,200	—	—	—	—	—	—	—	—	—
Indian Territory,	71,000	—	—	—	—	—	—	—	—	—
Total,	2,967,957	7,239,814	9,638,131	12,866,020	17,069,453	23,191,876	26,957,471	488,070	3,953,760	31,443,321

* The numbers marked with an asterisk indicate the Indian populations of the respective states. The number of Indians in those states and territories, as returned by the census, was 44,020; but this does not appear to include any of the wandering tribes.

It will be seen by the preceding table that the total population increased from less than 10,000,000 in 1810, to over 31,000,000 in 1860. An official estimate in 1867 gave the numbers as 34,505,882, or an increase of 3,062,561 since 1860, notwithstanding the civil war.

There is nothing in the Old World to equal this rate of progress. The population of Great Britain and Ireland in 1800 was 16,000,000, and in 1861 was under 30,000,000. Since 1830 the population of the United States has increased 19,000,000, whilst that of the United Kingdom has increased less than 6,000,000.

The cause of this great increase of population in America is immigration, which is not the case with any of the older European nations. Whilst the growth of the population of Great Britain represents almost exclusively the natural increase of a populous and thriving country, the increase in the population of the United States represents an entirely different element.

It has been mathematically demonstrated that if the United States since the year 1800 had been in the same circumstances as Great Britain—that is, if there had been no immigration and the increase of her population had arisen from natural causes only—the free white and coloured people of the States would, at the present time, have only numbered 10,463,000, or one-third of the present inhabitants. In fact, it is estimated that the immigrants of the present century, and their descendants, number more than 23,000,000, or two-thirds of the whole population.

Prior to 1820 no returns were taken of the number of aliens landing in the United States. It is estimated that there were about 70,000 arrivals between 1800 and 1810, and about 114,000 between 1810 and 1820.

		Immigrants.
In the ten years ending 1829 there were		128,502
" " 1839 "		538,381
" " 1849 "		1,427,337
In the eleven years " 1860 "		2,968,194
Total, . . .		5,062,414
Of this total there were:—		
Males, ...		2,977,603
Females, ...		2,035,536
Sex not stated, ...		49,275
Total, . .		5,062,414

Great Britain and Ireland have contributed most largely to this immigration, having furnished over 3,000,000 out of the 5,000,000. Next to the United Kingdom, Germany has supplied the largest addition to the population, the number of immigrants from that country between 1820 and 1860 having been 1,500,000. France has sent over 200,000, and every other country in Europe has been represented in a greater or lesser degree. Nearly all the emigrants have settled in the northern states.

It is of great advantage to the United States that by far the larger proportion of the immigrants are of the age at which they are best fitted for labour. The records show that upwards of 50 per cent. of the whole were between fifteen and thirty years old. Only 10 per cent. were above forty, and only about 8 per cent. under five.

The area, population, and number of inhabitants to the square mile in various groups of states, in the year 1860, and the increase, in percentage, over the previous decennial period, is given in the following table:—

States.	Area in square miles.	1860. Population.	1860. Number of inhabitants to sq. mile.	1850. Number of inhabitants to sq. mile.
Six New England States,	63,272	3,135,283	49·55	43·11
Six Middle States, including Maryland, Delaware, and Ohio, . . .	151,760	10,597,661	69·83	56·36
Six Coast Planting States, including South Carolina, Georgia, Florida, Alabama, Mississippi, and Louisiana, . . .	296,077	4,364,927	15·25	12·43
Six Central Slave States, namely, Virginia, North Carolina, Tennessee, Kentucky, Missouri, and Arkansas, . . .	309,210	6,471,887	20·93	16·71
Seven North-western States, namely, Indiana, Illinois, Michigan, Wisconsin, Iowa, Minnesota, and Kansas,	250,295	5,543,382	22·14	10·92
Texas, ...	237,321	604,215	2·55	0·89
California, ...	188,982	379,994	2·01	0·87

The six Middle states have the densest population, which, however, is considerably less than that of Turkey in Europe. Sweden and Norway, which has the thinnest population of any state in Europe, possesses seven times as many inhabitants to the square mile as Texas and California. The population of Prussia and Austria is three times, and that of Great Britain five times, as dense as that of the six New England states. As for the southern states, comprising the six Coast Planting and the six former Central Slave states, their population, at the census of 1860, was only half as dense as that of Russia in Europe, and their rate of increase has always been very much smaller than that of the northern states. The ratio of increase of the population of the United States for the several decennial periods, in which a census was taken, was as follows:—

		Ratio of Increase. Per Cent.
1790, ...	3,920,827	
1800, ...	5,305,937 ...	35·02
1810, ...	7,239,814 ...	36·45
1820, ...	9,638,131 ...	33·13
1830, ...	12,866,020 ...	33·46
1840, ...	17,069,453 ...	32·67
1850, ...	23,191,876 ...	35·87
1860, ...	31,443,790 ...	35·58

This shows an average decennial increase of 34·50 per cent. in population through the seventy years from the first to the last census.

The settler in the United States has an opportunity of selecting a locality peopled, to a great extent, by his own countrymen. If he is the head of a family, or twenty-one years of age, and intends to settle and become a citizen, he can receive at the hands of the government, substantially as a free gift, a 'homestead,' consisting of a quarter section of a square, or 160 acres of land. Each of his children, reaching twenty-one years of age, receives the like advantage. If, instead of taking up his homestead in a distant district, the immigrant chooses to pursue his profession, trade, or business in any of the larger cities or towns, or in the country parts of the more densely-peopled states, he ordinarily finds the wages of unskilled labour at least twice as high as those he had in Europe, with, for the most part, cheaper prices of the necessaries of life.

The north-east states, the oldest settled portions of the country, bear the greatest resemblance to Great Britain. The villages of New England are uniformly clean, airy, and neat, with spacious openings near the centre, in which churches form the most prominent feature. The houses are in some instances built of brick, but more frequently of wood, painted white with green Venetian blinds opening to the outside. Both churches and dwelling houses seem to be painted almost annually; at least they are never seen in the slightest degree dingy-coloured. The houses of every size and fabric have a light appearance, from the number of windows they contain, and the villages only want the judicious aid of flowers and shrubs to render them beautiful. Landscape gardening, and similar ornamental work, is, however, very backward in nearly every part of America.

In the newly-settled states of the west, the farmer is, of course, obliged to dispense with much of the civilization of the east, and live in his log-house with a few necessary articles of furniture in the rudest and most primitive manner. But if his style of life be less comfortable, he reaps the benefit of his privations in a more rapid accumulation of wealth. Nothing is more striking to a European in America than the entire absence of pauperism, rags, and beggars, and the universal respectability of appearance of all classes. The equal distribution of wealth in the United States is, certainly, a very marked feature of the nation. Whilst there may be said to be no poor, the number is also comparatively few of those who would be classed as very rich in England. In a word, the wealth of America is diffused. You find few inordinately rich, but you

find nearly every one able to meet the demands that can be justly made on him.

The character of the original settlers in the United States has left its impress to a certain extent upon their descendants, though in many parts of the country all such distinctive traces have been obliterated by the streams of subsequent immigration. In New England there is a strong remnant of the Puritan character; in Maryland the descendants of the English Roman Catholics who came over with Cecil Calvert are yet a prominent element of the population. New York obtained its first settlers from Holland, and in some remote villages of that state Dutch was not long since the language of a considerable portion of the inhabitants. Delaware and New Jersey were first settled by the Dutch and Swedes; Pennsylvania by English Quakers, followed by many Germans, whose descendants form a numerous class of the population; North Carolina by non-conformists from Virginia. In South Carolina a large number of Huguenots found a home soon after its first settlement by whites; Louisiana, when purchased by the United States, was inhabited chiefly by French families; Texas and California are still to some extent Spanish, and the latter state contains 21,000 Chinese. The Mormons of Utah are mainly English, with a large admixture of native Americans, Welsh, Scandinavian, and other nationalities. In the other states the first settlers cannot be said to have transmitted any distinctive national traits to their descendants of the present day.

In many parts of the newly settled north-west there is a large number of half-breeds or descendants of whites and Indians; but beyond the perpetuation of numerous local names, the impress left upon the older and more thickly settled portions of the country by its aboriginal inhabitants is scarcely discernible. They have there nearly all disappeared, and the few that remain are chiefly gathered in small communities by themselves, more or less assimilated in modes of life to their white neighbours. In the extreme west they still form in many places the principal or sole population, and roam in all their primitive wildness. A few tribes, like the Apaches, Comanches, and Navajoes, are still openly or secretly hostile to the whites. In all cases where it has been practicable, the Indians have been removed to 'reservations' of land set apart for their use, and formally secured in common to the tribe, or part of a tribe, which occupied them, according to their own system of land ownership. Since 1858, however, the plan has been adopted of granting titles in severalty to tracts of forty to eighty acres to any Indians who could cultivate them, and among the more civilized tribes this has had a good effect. Whenever savage Indians can be induced to remove to reservations, the government pays them for the land they relinquish, and it has now invested for their benefit 3,500,000 dollars, the interest of which is regularly paid them. They also receive small annuities from the United States. A part of the Cherokees, Creeks, and Choctaws, settled in the Indian territory, have adopted the customs of civilization, and are in some sort distinct nations, under the protection of the United States. Exclusive of these, the Indians have 241 farms (6112 acres) in cultivation, and own horses, mules, cattle, farming implements, and other personal property to the value of 4,670,043 dollars. There are seventy-seven missionaries, and 162 schools among them, the latter having 5950 pupils and 186 teachers. The management of Indian affairs is intrusted to a bureau of the department of the interior, under the charge of a commissioner.

Negroes were introduced as slaves into all the colonies in their infancy, and up to the time of the Emancipation Act of 1863 were held as such in fifteen of the thirty-four states, forming in some nearly or more than half the population. The importation of slaves into the United States was interdicted by law in 1808. In 1774 the legislature of Rhode Island interdicted the importation of slaves into that colony; and the next year, and while still a British colony, passed a law of emancipation by declaring the children of all slave mothers to be born free. Massachusetts abolished slavery by the bill of rights in 1780. Connecticut, in 1784, put a stop to the introduction of negroes, and declared all born after March 1 of that year free at the age of twenty-six. Pennsylvania prohibited the introduction of slaves in 1780, and declared free all children of slave mothers born after the passing of the law. Virginia prohibited the importation of slaves in 1778, and Maryland in 1783. Slavery was abolished in New Hampshire in 1792, in New York in 1799, and in New Jersey in 1825, and the constitutional amendment of December 18, 1865, abolished it throughout the whole of the States. The commingling of the negroes with the whites has produced a numerous class of hybrids of all shades of complexion, known, according to their respective proportion of African blood, as mulloes, mulattoes, quadroons, octoroons, &c.

It may be as well to state that the population of the United States has been ascertained at all times with very great accuracy. The census is taken in obedience to article 1, section 2, of the constitution, which provides that 'representatives and direct taxes shall be apportioned among the several states which may be included in this Union, according to their respective numbers, and for this purpose an actual enumeration shall be made every ten years.'

Revenue and Expenditure.—In examining the financial position of the United States, the first and most striking feature is the comparatively small amount of the ordinary national expenditure. Whilst the expenditure of Great Britain and Ireland, in 1860, amounted to upwards of 68,000,000*l.*, that of the United States, in the same year, was only 15,500,000*l.*; and this amount included a payment of about 14,000,000 dollars, or 2,800,000*l.*, on account of the principal of the public debt then owing by the nation. The entire interest of the public debt at that time amounted to only 3,144,620 dollars, or 650,000*l.*

The items of the expenditure of the United States in 1860 are shown in the following table:—

EXPENDITURE OF THE UNITED STATES GOVERNMENT, 1860.

	Dollars.
1. Civil List,	6,077,003
2. Foreign Intercourse,	1,146,143
3. Navy,	11,514,649
4. War,	16,472,202
5. Pensions,	1,100,802
6. Indians,	2,991,131
7. Miscellaneous,	20,708,183
Total Ordinary,	60,010,113
8. Interest on Debt,	3,144,620
9. Principal of Debt,	13,900,392
	17,045,012
Grand Total,	77,055,125

In proportion to population, the United States, in 1860, had the smallest expenditure and the smallest national debt of any country in the world, as will be seen by the following table, which gives the expenditure and liabilities of the great European nations at that time:—

Nation.	Population.	Expenditure.	Debt.
		£	£
Austria, . . . (1860)	35,000,000	36,660,033	225,000,000
France, . . . "	37,000,000	82,620,301	389,000,000
Great Britain, "	30,000,000	69,502,289	802,000,000
Italy, ... (1862)	22,000,000	38,973,896	200,000,000
Prussia, . . . "	18,500,000	19,031,041	40,000,000
Russia, . . . "	74,000,000	44,374,248	60,000,000
Spain, . . . "	16,000,000	20,366,183	107,000,000

It will be seen that the United States, with a population of nearly 31,000,000, had a much smaller expenditure than any of the above countries, whilst her debt was little more than nominal.

This contrast is very striking, if it is regarded only as relating to the population. But if the expenditure of America is considered in relation to the extent of her territory, the abundance and variety of her products, the value of her mineral resources, the industry of her population, her manufactures, her commerce, and the accumulated and rapidly-increasing wealth of her people, the contrast presented is even more remarkable. For, with the exception of Great Britain, no nation approaches the United States in any one of these respects; and yet every one of the nations, with less resources, had to bear, up to 1860, a much heavier burden of expenditure.

The whole revenue of the United States in 1860 was raised from customs duties and sales of land. For a long series of previous years there can scarcely have been said to have been any direct internal taxation for national purposes in America. At the outbreak of the war of 1812 the expenditure of the United States was only 13,500,000 dollars, or 2,700,000*l.* a year, the whole of which was met by light and easy customs duties. The war of 1812 raised the expenditure from 13,000,000 dollars to 22,000,000 dollars, 39,000,000 dollars, and 48,000,000 dollars; and direct taxes were then obliged to be levied. But about the year 1818 a surplus, amounting to nearly 40,000,000 dollars, being found in the exchequer, the burden of direct taxation was removed, and the internal taxes became of merely nominal amount up to 1836, when they ceased entirely. In addition, therefore, to having the smallest proportionate expenditure of any nation, the people of the United States, during the greatest part of the present century, have enjoyed the remarkable advantage of being the most lightly taxed people of the world. If the enhanced prices of certain classes of manufactures, caused by customs duties imposed for the purpose of protection, be excepted, the people of the United States may be said to have, practically, paid no taxes for national objects.

But the breaking out of the civil war in 1861 altered the whole condition of the expenditure and revenue of the United States. The total expenditure, which was 77,000,000 dollars in 1860, rose to 85,000,000 dollars in 1861, to 571,000,000 dollars in 1862, to 715,000,000 dollars in 1863, and to no less than 1,897,000,000 dollars in 1865; or from 15,500,000*l.* to nearly 380,000,000*l.*, in five years. The bulk of this enormous expenditure of course went for purposes of war. Out of the

1,897,000,000 dollars, the army and navy absorbed 1,153,000,000 dollars, or nearly two-thirds of the whole. During the last year of the war the public debt was increased 941,902,537 dollars (about 190,000,000*l.*), and in August, 1865, when it was at its maximum, the total debt was 2,757,689,571 dollars, or nearly 560,000,000*l.* The interest on the debt rose from 3,000,000 dollars in 1860 to more than 140,000,000 dollars in 1865: or to nearly as much as double the sum-total of the national expenditure for the five years previous.

To meet this large expenditure, not only were the customs duties largely enhanced, but direct and internal taxes of large amounts were levied, and greatly augmented in each successive year. They produced as follows:—

PRODUCT OF DIRECT TAXATION IN AMERICA.

Years.	Dollars.
1862, ...	1,795,332
1863, ...	41,003,192
1864, ...	116,850,672
1865, ...	211,129,529

Thus upwards of 42,000,000*l.* sterling was levied in the form of direct internal taxation during the last year of the war.

But even in the darkest hours of the conflict there appears to have been no hesitation amongst the bulk of the people of the North. They were prepared to submit to any outlay—to any burden of taxation possible to be borne—in order to bring the war to a conclusion, and to preserve the Union; and when the war was brought to a termination, and the South once again came under the peaceful and undisputed control of the general government, it seems to have been felt that no ground for alarm or distrust remained; and that, once brought back to the prosperity which they had previously enjoyed, the South would in due time contribute largely to the liquidation of the public debt, and would thereby vastly relieve the general pressure of the burden of taxation. As yet their hopes in the latter respect have not been fulfilled. The South is still in a deplorable condition of anarchical misgovernment and general disorganization. But the vast resources of the western and northern states have in themselves sufficed.

There can be no doubt whatever that the resources of the country are amply sufficient to pay the debt, large as it is, and that too in a comparatively short period—say thirty years. A revenue of 60,000,000*l.* per annum (10,000,000*l.* less than is now raised in the United Kingdom) would clear it off entirely in that time; and if what has already been done may be taken as an earnest of their future conduct in the matter (and remembering, too, that the debt incurred by the war with Great Britain, in 1812, was entirely discharged from the ordinary sources of revenue in nineteen years), it is evident that the American people are anxious that it should be liquidated as soon as possible. Even as early as October, 1866, or only fourteen months after the maximum had been reached, the debt had been reduced by 206,000,000 dollars (41,000,000*l.*), or nearly 8 per cent. of the whole; and in the financial year ending June 30, 1867, the total reduction had been increased to 60,000,000*l.* The capabilities of the country in paying off the debt will be easily seen from the following table, which shows the value of real estate and personal property according to the census of 1850 and that of 1860: also the increase, and the increase per cent:—

States and Territories.	Real Estate and Personal Property.		Increase.	Increase per cent.
	1850.	1860.		
	Dollars.	Dollars.	Dollars.	
Alabama, .	228,204,332	495,237,078	267,032,746	117·01
Arkansas, .	39,841,025	219,256,473	179,415,448	450·32
California,	22,161,872	207,874,613	185,712,741	837·98
Connecticut,	155,707,980	444,274,114	288,566,134	185·32
Delaware, .	21,062,556	46,242,181	25,179,625	119·54
Florida, . .	22,862,270	73,101,500	50,239,230	219·74
Georgia, .	335,425,714	645,895,237	310,469,523	92·56
Illinois, . .	156,265,006	871,860,282	715,595,276	457·93
Indiana, .	202,650,264	528,835,371	326,185,107	160·95
Iowa, . .	23,714,638	247,338,265	223,623,627	942·97
Kansas, . .	—	31,327,895	—	—
Kentucky, .	301,628,456	666,043,112	364,414,656	120·81
Louisiana, .	233,998,764	602,118,568	368,119,804	157·31
Maine, . .	122,777,571	190,211,600	67,434,029	54·92
Maryland, .	219,217,364	376,919,944	157,702,580	71·93
Massachus.	573,342,286	815,237,433	241,895,147	42·19
Michigan, .	59,787,255	257,163,983	197,376,728	330·13
Minnesota, .	No return.	52,294,413	—	—
Mississippi,	228,951,130	607,324,911	378,373,781	165·26
Missouri, .	137,247,707	501,214,398	363,966,691	265·18
N. Hampsh.	103,652,835	156,310,860	52,658,025	50·80
New Jersey (partly estimated),	200,000,000	467,918,324	267,918,324	133·95
New York,	1,080,309,216	1,843,338,517	763,029,301	70·63
N. Carolina,	226,800,472	358,739,399	131,938,927	58·17
Ohio, . . .	504,726,120	1,193,898,422	689,172,302	136·54
Oregon, . .	5,063,474	28,930,637	23,867,163	471·35
Pennsylvan.	722,486,120	1,416,501,818	694,015,698	96·05
Rhode Isl'd,	80,508,794	135,337,588	54,828,794	68·10
S. Carolina,	288,257,694	548,138,754	259,881,060	90·15
Tennessee,	201,246,686	493,903,892	292,657,206	145·42
Texas, . .	52,740,473	365,200,614	312,460,141	592·44
Vermont, .	92,205,049	122,477,170	30,272,121	32·83
Virginia, .	430,701,082	793,249,681	362,548,599	84·17
Wisconsin.	42,056,595	273,671,668	231,615,073	550·72
District of Columbia,	14,018,874	41,084,945	27,066,071	193·06
Nebraska Territory,	—	9,131,056	—	—
New Mexico Territory,	5,174,471	20,813,768	15,639,298	302·24
Utah Terri.	986,083	5,596,118	4,610,035	467·50
Washington Territory,	—	5,601,466	—	—
Total, .	7,135,780,228	16,159,616,068	8,925,481,011	126·45

It thus appears that the total value of real and personal estate in the United States was—

	Dollars.
In 1850	7,135,780,228
In 1860	16,159,616,068

or an increase of 126 per cent. in ten years. At the same rate of increase, the value of real and personal estate in 1870 would be 36,593,450,585 dollars. But suppose that, in consequence of the civil war and the position of the South, the increase at the end of the next decade is estimated at only one-half of the rate of increment during the last; that will give nearly 27,000,000,000 dollars as the aggregate property of the United States in 1870. In proportion to this capital the whole debt of 2,500,000,000 dollars stands in the relation of about one in eleven, and the annual taxation of 300,000,000 dollars, or 60,000,000*l.*, only in the ratio of one in ninety.

The burden of the debt and the taxation of the United States, in comparison with that of other nations, will therefore still be an easy one. It is very much easier than that which is borne in Great Britain, with a debt one-fourth larger, with ordinary expenses of more than double the amount of those in the United States, and with, in many respects, less wealth-producing power.

The actual receipts of the United States for the financial year ending June 30, 1866, were:—

	Dollars.	Cents.
Customs, ...	179,376,878	60
Internal revenue, ...	309,510,934	37
Sales of public lands, ...	741,539	61
Direct taxes, ...	1,486,118	05
Other miscellaneous sources, . .	66,941,485	05
Total revenue, exclusive of loans,	558,056,955	68

During the same period the expenditure was as follows:—

	Dollars.	Cents.
Civil list and diplomatic, . . .	41,017,921	85
Pension list and Indian affairs, .	18,852,457	11
War department, ...	284,459,701	82
Navy department, ...	43,364,118	52
Interest on public debt, ...	133,139,359	70
Total expenditure, ...	520,833,559	0

The revenue for the financial year 1866, as above given, was wholly raised from taxation, with the exception of the small amount received from land sales, and about 30,000,000 dollars of the 'miscellaneous' receipts, which were realized from sales of government property at the close of the war. The remainder of the 'miscellaneous' item was the premium obtained from the sales of government gold. The above totals represent currency values, but when reduced to gold values by taking the average premium during the fiscal year—140 per cent.—the receipts of the government in gold were 384,834,173 dollars, 41 cents, and the expenditure, in gold, was 312,500,155 dollars, 40 cents.

In his message to Congress in 1866 the president stated:—'It is estimated that the receipts for the fiscal year ending the 30th June, 1867, will be 475,061,386 dollars, and that the expenditure will reach the sum of 316,428,078 dollars, leaving in the Treasury a surplus of 158,633,308 dollars. For the fiscal year ending June 30, 1868, it is estimated that the receipts will amount to 436,000,000 dollars, and that the expenditure will be 350,247,641 dollars; showing an excess of 85,752,359 dollars in favour of the government. These estimated receipts may be diminished by a reduction of excise and import duties; but after all necessary reductions shall have been made, the revenue of the present and of following years will doubtless be sufficient to cover all legitimate charges upon the Treasury, and leave a large annual surplus to be applied to the payment of the principal of the debt. There seems now to be no good reason why taxes may not be reduced as the country advances in population and wealth, and yet the debt be extinguished within the next quarter of a century.'

Formerly the Federal government would only recognize a specie currency (although paper money was issued by banks chartered by the different states); but the necessities of the war compelled them to issue a large amount of paper currency—popularly known as 'greenbacks'—and to establish a system of national banks, which now amount to more than 1600 in number, with a capital of 400,000,000 dollars.

The amount of circulating paper currency in the country at the end of 1866 was about 834,000,000 dollars, of which 295,354,834 dollars were national bank-notes, and the balance 'legal tender notes,' or as they are generally called, 'greenbacks.' The *maximum* amount of National Bank issues permitted is

300,000,000 dollars. The secretary of the Treasury has charge of the whole of the finances of the country.

Army and Navy.—By the eighth section of the first article of the constitution of the United States, Congress is empowered in general 'to raise and support armies;' and by the second section of the second article, the president is appointed commander-in-chief of the army and navy, and of the militia when called into the service of the United States. On August 7, 1789, Congress established a Department of War as the instrument of the president in carrying out the provisions of the constitution for military affairs. A number of 'Original Rules and Articles of War' were enacted by the Congress of 1776, and continued in force under the constitution, with several modifications. These rules were the basis of the actual Articles of War which were enacted in 1806, and have been but slightly altered since that time. They form the military code which governs all troops when mustered into the service.

In 1790 the rank and file of the army, as fixed by an Act of Congress, amounted to 1216 men; to which force, in the next year, one regiment, 900 strong, was added. In 1792 an Act of Congress provided for a uniform militia throughout the United States, and the system then arranged has received but slight alterations up to the present time. The nominal strength of the militia thus organized amounts to 3,250,000 men. This body is entirely under the control of the governors and legislative assemblies of the individual states, except when it is called into the actual service of the general government, when they are placed under the control of the president. In 1796 the regular army consisted of a corps of artillerists and engineers, two companies of light dragoons, and four regiments of infantry of eight companies each. This force was little increased, except occasionally, till the outbreak of the civil war.

At the commencement of the year 1861, the United States army comprised about 14,000 regular troops, stationed chiefly in the southern states. A large number of these joined the cause of the so-called Confederate states, reducing the Federal army to less than 5000 men. On April 15, 1861, the president called out 75,000 volunteers for three months, to defend the capital, which was threatened; and on May 3 he called out 42,000 more to serve for three years or during the war. On July 22, 1861, Congress passed an Act authorizing the president to accept the services of 500,000 volunteers for such terms as he might deem necessary, ranging from six months to three years or during the war. On July 25, 1861, the president was again authorized to call out 500,000, making in all 1,000,000 men. The number proving insufficient for the active prosecution of hostilities, and the repair of losses occasioned by the war, a draft was ordered in the summer of 1863, by proclamation of the president of the United States. By a new proclamation of the president, dated October 17, 1863, a levy of 300,000 men was ordered, and another call of 500,000 men was made February 1, 1864. The total number of men called into the field by the government of the United States, from 1861 till the end of the civil war in 1865, amounted to 2,653,062, or nearly one-fourth of the entire male population of the northern states. This vast number served various terms of service, from three months to three years; but so many served the longer term that when reduced to the three years' standard the aggregate terms of service were equivalent to 2,129,041 men serving for three years. The army was supplied in various ways, volunteering, enlistment in the regular army, and by drafts and conscripts, but the greater part by bounties of from 300 to 1000 dollars to each volunteer. Large numbers of recruits were also supplied by newly arrived emigrants, and at the close of the war the Federal forces comprised nearly 50,000 negro troops recruited in those Confederate states which had been successfully invaded by the Northern armies. Of the troops enrolled during the war the state of New York furnished over one-sixth of the whole number, Pennsylvania one-eighth, Ohio one-ninth, and Massachusetts one-fifteenth: these four giving to the army one-fifth of their entire male population. New Hampshire and Vermont sent one-fourth of their male citizens, and Indiana and Illinois rather more. Kansas showed the highest proportion, having sent 36 per cent. of her men, while Iowa sent 30 per cent. The southern, or Confederate states, had in the field, during the greater part of the war, an army of 400,000 men, of which, it is estimated, they lost 300,000 from wounds and disease. The Southern army was entirely disbanded in April, 1865; and of the Northern there remained but 210,000 men on the pay rolls on July 31 of the same year, only about two months after the conclusion of the war. The policy of the government after this date was to muster out every volunteer soldier, and retain only the regulars.

Perhaps one of the most convincing proofs that could be given of the wonderful resources of America and the aptitude of the people to adapt themselves to almost any circumstances, was shown in the disbandment of the army at the close of the civil war. Within a very few months nearly 1,000,000 were discharged and absorbed into other occupations with scarcely the least trouble or anxiety to the government.

Under the Act of July 28, 1866, the regular army of the United States now comprises ten regiments, or 120 companies, of cavalry; five regiments, or sixty companies, of artillery; and forty-five regiments, or 450 companies, of infantry, of which two cavalry and four infantry regiments are composed of coloured men, and four infantry regiments of men who were wounded in the war. The latter have been assigned to districts where they may be usefully employed in guarding storehouses and cemeteries, and on similar duties. The law authorizes an assignment of 100 privates to a company as the *maximum*, fifty being the *minimum*, and the *maximum* strength of the army is thus placed at 75,382 rank and file. The present strength of companies is fixed at sixty-four privates for cavalry, artillery, and infantry, and 122 privates for light batteries of artillery, making an aggregate strength of 54,302. The importance of providing the army with breech-loading small arms of the best pattern has been recognized and acted upon. The officers of the regular army in the United States are chiefly supplied by cadets, who are nominated from each state by members of Congress, and appointed by the president. They are educated at the military academy, West Point, New York. The chief arsenals are at Springfield, Massachusetts, and Pittsburg, Pennsylvania. From the 1st of January, 1861, to the 30th of June, 1866, the Ordnance Department provided 7,892 cannon, 11,787 artillery carriages, 4,022,130 small arms, 2,362,546 complete sets of accoutrements for infantry and cavalry, 539,544 complete sets of cavalry horse equipments, 28,164 sets of horse artillery harness, 1,022,176,474 cartridges for small arms, 1,022,555,435 percussion caps, 2,862,177 rounds of artillery ammunition, 14,507,682 cannon primers and fuses, 12,875,294 lbs. of artillery projectiles, 26,440,054 lbs. of gunpowder, 6,395,152 lbs. of nitre, and 90,416,295 lbs. of lead.

In his message to Congress in 1866, the president stated that sufficient war material to meet any emergency had been retained, and, from the disbanded volunteers standing ready to respond to the national call, large armies could be rapidly organized, equipped, and concentrated. Fortifications on the coast and frontier had received, or were being prepared for more powerful armaments; lake surveys and harbour and river improvements were in course of energetic prosecution. More than 6000 maimed soldiers had received artificial limbs or other surgical apparatus; and forty-one national cemeteries, containing the remains of 104,526 Union soldiers, had already been established. The total estimate of military appropriations for 1867 was 25,205,669 dollars, or rather over 5,000,000*l*.

Of the soldiers who fought in the revolutionary war of 1775–83, only one is now living. He receives a pension, and pensions are also still paid to 900 widows of revolutionary soldiers. There were on the 30th of June, 1866, 126,722 military and naval pensioners on the rolls, and to pay them for the year required over 33,000,000 dollars. With the exception of about 3000 these are all pensioners of the late civil war.

For a period of nine years after the government of the United States was organized, there was no navy department. The executive duties growing out of the management of the naval forces had been committed by Congress to the War Department by an Act approved August 7, 1789. It was not until April 30, 1798, that a separate department was created, with a chief officer called the Secretary of the Navy.

The naval forces of the United States, at the commencement of the year 1861, consisted of forty-one men-of-war on active service, the greater number of them sailing vessels. Congress having then decreed the creation of a steam navy, no less than 500 steamers of different sizes were built between that time and the close of the war. The sailing vessels were also increased to over 100, so that the total fleet amounted to upwards 600 vessels, carrying nearly 5000 guns, and being upwards of 500,000 tons burthen. Several of the vessels in the United States belong to the class called Monitors [Cupola Ship], and carry immense armaments. At the close of 1866 the naval force had been reduced to 278 vessels, many of them iron-clads, carrying 2351 guns, of which 115 ships, with 1029 guns and 13,600 men, were then in commission.

The United States possess eight dockyards, namely, Portsmouth, Charlestown, Brooklyn, Philadelphia, Washington, Norfolk, Pensacola, and Mare Island. Portsmouth, New Hampshire, has an area of 63 acres, but nearly 5 acres must be filled in before the land can be used. The yard is situate on an island, and has a water front of about 1000 feet; it has one floating dry dock and three building slips. Charlestown, near Boston, covers 80 acres of ground, but 16 acres of this are marsh, and must be filled in. The yard has one stone dry dock and two building slips. Brooklyn covers a surface of 80 acres of available ground and 40 acres of marsh that can be filled in—120 acres in all. There is at present an available water frontage of 1200 feet, one stone dry dock, and two building slips. Philadelphia yard has only 15 acres surface, and 1 acre of this must be filled in to be available. The yard has one floating dry dock, two building slips, and a water front of about 600 feet. Washington yard has an area of 42 acres, 2 acres of which are marsh, and there is a water frontage of 900 feet with two building slips. The yard has no dry dock. Norfolk and Pensacola yards were destroyed in the civil war, and at present no work of any importance is done at either of them. Mare Island, on the Pacific, is yet unfinished, and is used only as a place of temporary repair. A naval academy has been established at Annapolis, Maryland, for the education of naval cadets.

Government.—The several states of the Union, so far as their internal affairs are concerned, are sovereign and independent, while for the common interests of all they delegate a portion of their powers to a central government, whose edicts and laws, so long as they are not in conflict with the constitution, are paramount to state authority. The government consists of three branches—the legislative, executive, and judicial. The executive power is vested in a president, who is the only executive officer known to the constitution, and who, together with a vice-president, is elected for four years by a college of electors, appointed in every state as the respective legislatures may direct; each one returning as many electors as it is entitled to have senators and representatives in Congress. In South Carolina the electors are chosen by the legislature; in all the other states, by popular vote. In case of the removal, death, resignation, or inability of the president, the vice-president succeeds to the presidency; and in case of the failure of both president and vice-president, Congress has authority to declare what officer shall act as president until the disability be removed or a president shall be elected. By Act of Congress approved March 1, 1792, the president of the Senate *pro tempore*, or in case there be no president of the Senate, the speaker of the House of Representatives, is to act as president in such a case. The latter contingency has never yet occurred, and the former only in three instances, viz., on the death in office of Presidents Harrison (1841), Taylor (1850), and Lincoln (1865). When there is no election of president by the people for want of a majority of electoral votes for any one candidate, the House of Representatives chooses the president from the three having the highest number of votes, the body of representatives from each state giving a single vote. Two elections by the House have occurred, viz., in 1800 (under the original provision of the constitution, which requires that the highest candidate should be president, and the next highest vice-president), when, there being a tie between Thomas Jefferson and Aaron Burr, the former was chosen president by the House; and in 1824, when John Quincy Adams was chosen. The president, as well as all other civil officers, may be removed from office on impeachment for, or conviction of, treason, bribery, or other high crimes and misdemeanors. The president has power, by and with the advice and consent of the Senate, to make treaties and to choose ambassadors and other public officers of the United States, whose appointment is not otherwise provided for. In fact, what with officers in the army and navy, revenue officers, postmasters, and others, he nominates nearly 100,000 persons to different offices. The president receives a salary of 25,000 dollars a year, and the vice-president 8000 dollars. All Acts of Congress must be presented to the former before they can become law, and he may, within ten days from its presentation, return any bill of which he disapproves to the House in which it originated, stating his objections. If, on reconsideration, the bill is again passed by two-thirds of each house, it becomes law. The occasions when presidents of the United States have used their veto power have been very rare. From the establishment of the republic to the end of the year 1866, a period embracing thirty-nine Congresses, there

were but twenty-eight vetoes, being an average of one in three years. Of these vetoes President Washington sent two to Congress; President Madison, six; President Monroe, one; President Jackson, nine; President Tyler, four; President Polk, three; President Buchanan, one; and President Johnson, two. Presidents John Adams, Jefferson, John Quincy Adams, Van Buren, Harrison, Taylor, Fillmore, Pierce, and Lincoln, sent no vetoes to Congress, and their administrations covered an aggregate of nearly thirty-three years. Of the twenty-eight vetoes sent to Congress, in but two cases were the adherents of the rejected bills able to muster two-thirds of the members for their passage. The first case was an unimportant law in President Tyler's administration, and the other was the second veto of President Johnson, the Civil Rights Bill, which was passed against his veto in the session of 1866. If any bill is not returned by the president within ten days after it has been presented to him, it becomes a law, in like manner as if he had signed it. The elections for president and vice-president are held in all the states on the first Tuesday in November, every four years; and on the 4th of March following the president elect is inaugurated. He must be a natural-born citizen, at least thirty-five years of age, and fourteen years a resident within the United States. He is assisted by a cabinet of seven ministers, called the secretaries of state, of the treasury, of the interior, of the navy, and of war, the attorney-general, and the post-master-general, who are nominated by him, and whose appointments are confirmed by the Senate. They each receive 8000 dollars a year. These officers have no seats in Congress, and are solely responsible to the president, by whom they may be removed at pleasure.

The whole legislative power is vested by the constitution in a Congress, consisting of a Senate and House of Representatives. The Senate, or Upper House, consists of two members from each state, chosen by the state legislatures for six years, a third going out of office every two years. Senators must not be less than thirty years of age; must have been citizens of the United States for nine years; and be residents of the state for which they are chosen. Each senator is entitled to one vote. The vice-president is president of the Senate, but votes only when that body is equally divided. Besides its ordinary capacity, the Senate is vested with certain judicial functions, and its members constitute a high court of impeachment. The judgment, however, only extends to removal from office and disqualification. Representatives have the sole power of impeachment.

The House of Representatives, or Lower House, is composed of members elected every second year by the people of the several states; the number to which each is entitled being decided by its population at the last census. The total of the representatives for the session of 1867 was 241, or one to every 124,000 of the population. Representatives must not be less than twenty-five years of age, must have been citizens of the United States for seven years, and be residents in the states for which they are chosen. In addition to the representatives from the states, the House admits one from each organized territory, who has a right to speak on subjects in which his district is interested, and may originate subjects for legislation, but is not entitled to a vote.

By the eighth section of the first article of the constitution of the United States, the Congress has power:—

1. To lay and collect taxes, duties, imposts, and excises, to pay the debts and provide for the common defence and general welfare of the United States; but all duties, imposts, and excises shall be uniform throughout the United States.

2. To borrow money on the credit of the United States.

3. To regulate commerce with foreign nations, and among the several states, and with the Indian tribes.

4. To establish a uniform rule of naturalization, and uniform laws on the subject of bankruptcies, throughout the United States.

5. To coin money and regulate the value thereof, and of foreign coin, and fix the standard of weights and measures.

6. To provide for the punishment of counterfeiting the securities and current coin of the United States.

7. To establish post-offices and post-roads.

8. To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.

9. To constitute tribunals inferior to the Supreme Court.

10. To define and punish piracies and felonies committed on the high seas, and offences against the law of nations.

11. To declare war, grant letters of marque and reprisal, and make rules concerning captures on land and water.

12. To raise and support armies, but no appropriation of money to that use shall be for a longer term than two years.

13. To provide and maintain a navy.

14. To make rules for the government and regulation of the land and naval forces.

15. To provide for calling forth the militia to execute the laws of the Union, suppress insurrections, and repel invasions.

16. To provide for organizing, arming, and disciplining the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the states respectively the appointment of the officers, and the authority of training the militia according to the discipline prescribed by Congress.

17. To exercise exclusive legislation, in all cases whatsoever, over such district (not exceeding 10 miles square) as may, by cession of particular states, and the acceptance of Congress, become the seat of the government of the United States, and to exercise like authority over all places purchased by the consent of the legislature of the state in which the same shall be for the erection of forts, magazines, arsenals, dockyards, and other needful buildings.

18. To make all laws which shall be necessary and proper for carrying into execution the foregoing powers, and all others vested by this constitution in the government of the United States.

Under the law of August 16, 1856, the salary of a senator, representative, or delegate in Congress is 6000 dollars for each Congress, at the rate of 3000 dollars per annum, and mileage at the rate of eight dollars for every 20 miles of estimated distance by the most usual road from his place of residence to the seat of Congress, at the commencement and at the end of every session; but this mileage is allowed for two sessions only in each Congress. The salary of the speaker of the House is double that of a representative, and the president *pro tempore* of the Senate, when there is no vice-president, is entitled to the salary allowed by law to the vice-president, of 8000 dollars per annum.

The times, places, and manner of holding elections for senators and representatives are prescribed in each state by the legislature thereof; but Congress may at any time by law alter such regulations, or make new ones, except as to the places of choosing senators. No senator or representative can, during the time for which he was elected, be appointed to any *civil* office under authority of the United States, which shall have been created or the emoluments of which shall have been increased during such time; and no person holding *any* office under the United States can be a member of either House during his continuance in office.

The period usually termed 'a Congress,' in legislative language, continues for two years; as, for example, from March 4, 1865, until March 3, 1867, at which latter time the term of the representatives to the thirty-ninth Congress expired, and the term of the new House of Representatives commenced. Congresses always commence and expire in years terminating with odd numbers, as 1789–91, which was the term of the first Congress, or 1865–67, the period of the thirty-ninth, or 1867–69, of the fortieth Congress.

By the tenth amendment of the constitution of the United States, passed December 15, 1791, the powers not delegated to Congress are reserved to the states or to the people. Therefore the right to enact municipal laws, that is, all those which concern only the states directly and immediately, are among the reserved privileges of the states and the people, and are vested by the latter in the legislatures of the former.

The separate states of the union are, therefore, sovereign in a municipal capacity; while the general government is sovereign in a national capacity, and is represented and known officially as the government of one nation. For instance, although the several states are sovereign and independent under the constitution, with all powers of local legislation, eminent domain (*i.e.*, absolute possession of the soil), and the power of life and death, with which neither president nor Congress can interfere, they cannot make treaties, coin money, levy duties on imports, or exercise any of the powers granted to Congress.

The constitutions of the several states all agree in their main features, and the powers vested in them are principally the same. In all there is the same form, and the same principles lie at the foundation. Most of the legislatures are elected by what is tantamount to universal suffrage. The executive in every state is vested in a governor. The duties of the governors are in general analogous to those of the president, as far as the several state governments are analogous to those of the Union. They have the nomination, and, in conjunction with the Senate, the appointment of many important officers. Like the president also, they make recommendations to the legislature, and take care that the laws are executed. Like the president, they may be impeached and removed for treason, bribery, or other high crimes. The territories are ruled by a governor appointed by the president, but they elect their own legislatures.

The Congress of the United States has the power to alter the constitution, by the 5th article of the same. The article orders that the Congress, whenever two-thirds of both Houses shall deem it necessary to propose amendments to the constitution, or on the application of the legislatures of two-thirds of the several states, shall call a convention for proposing the amendments, which in either case shall be valid to all intents and purposes as part of the constitution, when ratified by the legislatures of three-fourths of the several states, or by conventions in three-fourths thereof, as the one or the other mode of ratification may be proposed by the Congress.

Since the adoption of the constitution the offices of president and vice-president have been occupied as follows:—

PRESIDENTS OF THE UNITED STATES.

Name.	From State.	Term of Service.	Born	Died.
George Washington,	Virginia,	1789–1797	1732	1799
John Adams,	Massachusetts,	1797–1801	1735	1826
Thomas Jefferson,	Virginia,	1801–1809	1743	1826
James Madison,	Virginia,	1809–1817	1751	1837
James Monroe,	Virginia,	1817–1825	1759	1831
John Quincy Adams,	Massachusetts,	1825–1829	1767	1848
Andrew Jackson,	Tennessee,	1829–1837	1767	1845
Martin Van Buren,	New York,	1837–1841	1782	1862
William H. Harrison,	Ohio,	1841–1841	1773	1841
John Tyler,	Virginia,	1841–1845	1790	1862
James K. Polk,	Tennessee,	1845–1849	1795	1849
Zachary Taylor,	Louisiana,	1849–1850	1784	1850
Millard Fillmore,	New York,	1850–1853	1800	—
Franklin Pierce,	New Hampshire	1853–1857	1804	—
James Buchanan,	Pennsylvania,	1857–1861	1791	—
Abraham Lincoln,	Illinois,	1861–1865	1809	1865
Andrew Johnson,	Tennessee,	1865– —	1808	—

VICE-PRESIDENTS OF THE UNITED STATES.

Name.	From State.	Term of Service.	Born	Died.
John Adams,	Massachusetts,	1789–1797	1735	1826
Thomas Jefferson,	Virginia,	1797–1801	1743	1826
Aaron Burr,	New York,	1801–1805	1756	1836
George Clinton,	New York,	1805–1812	1739	1812
Elbridge Gerry,	Massachusetts,	1813–1814	1744	1814
Daniel T. Tompkins,	New York,	1817–1825	1774	1825
John C. Calhoun,	South Carolina,	1825–1832	1782	1850
Martin Van Buren,	New York,	1833–1837	1782	1862
Richard M. Johnson,	Kentucky,	1837–1841	1780	1850
John Tyler,	Virginia,	1841–1841	1790	1862
George M. Dallas,	Pennsylvania,	1845–1849	1792	—
Millard Fillmore,	New York,	1849–1850	1800	—
William R. King,	Alabama,	1853–1853	1786	1853
John C. Breckenridge,	Kentucky,	1857–1861	1821	—
Hannibal Hamlin,	Maine,	1861–1865	1809	—
Andrew Johnson,	Tennessee,	1865–1865	1808	—
Lafayette S. Foster,	Connecticut,	1865– —	1806	—

Judiciary.—The judiciary comprises a supreme court with one chief justice (salary 6500 dollars) and eight associate justices (salary 6000 dollars each), appointed for life by the president, by and with the advice and consent of the senate, and holding one session annually in Washington. The United States are divided into nine judicial circuits, in each of which a court is held twice every year for each state within the circuit. The country is also divided into fifty districts, in each of which there is a court called a district court, composed of one judge, who is elected by the people and resides in the district for which he is appointed, and who is competent to decide minor cases. The circuit-courts are composed each of a justice of the supreme court, and a judge of the district court in the district in which the court is held. In most cases each state constitutes a district, but New York, Pennsylvania, Virginia, Georgia, Florida, Mississippi, Louisiana, Arkansas, and California are divided into two, and Alabama, Tennessee, and Iowa into three districts each. The Supreme Court of the United States has jurisdiction in all cases of law and equity arising under the constitution and laws of the United States, and treaties made under their authority; in all cases concerning foreign ministers and agents; in all cases of marine jurisdiction; in all con-

troversies in which the United States shall be a party; in controversies between the Federal government and any state; between different states, or between a state and citizen of another state; between citizens of different states; between citizens of the same, claiming lands under grants of different states; and between a state and citizens thereof, and foreign states, citizens, or subjects. The president can reprieve or pardon a person condemned to punishment by a Federal court, but has no power to interfere with the judgment of the tribunals in the different states. Persons guilty of offences in one state and escaping into another, are at once given up, if apprehended.

Courts are established by the United States in each of the territories, their constitution and functions being prescribed by the Act of Congress organizing the district. In general they assimilate closely to the various state courts.

There is also a court to adjudicate claims against the United States, composed of a presiding judge and two associate judges (salary 4000 dollars each), which holds its sessions in the Capitol at Washington.

All the other courts are established by the authority of the several states, and their organization differs according to the state laws.

The trial of all crimes, except in cases of impeachment, must be by jury. The laws are in general based upon the common and statute law of England, but capital punishment is not often resorted to.

Ambassadors and Consuls.—The president, either directly or through the secretary of State and Foreign Affairs, appoints the ambassadors, consuls, and consular agents to foreign countries. The various grades of foreign envoys and ministers plenipotentiary receive from 6000 dollars to 17,500 dollars per annum. Of these the ambassador to Great Britain receives 17,500 dollars; the ministers to France and China, 15,000 dollars each; those to Spain, Russia, Austria, Prussia, Brazil, and Mexico, 12,000 dollars each; the envoy to Peru 10,000 dollars; and to Turkey and Chili each 9000 dollars. Ministers of the second grade receive 7500 dollars per annum; and secretaries of legation from 1500 to 2500 dollars. The commissioner to the Sandwich Islands receives 6000 dollars per annum. The consuls are paid by fees or salaries, varying from 500 to 7500 dollars per annum.

Religion.—There is no established or state church in the United States, but at the census of 1860 there were not less than 38,183 churches, affording 619 seats to every 1000 of the population. The most numerous denomination seems, from some published tabular statements, to be the Roman Catholic, comprising about 3,000,000 of adherents. The membership, however, unlike the Protestant-denominations, is supposed to include the whole population attending upon its worship. Only a small proportion of the Roman Catholics are of American parentage, most of them being Irish, French, and German emigrants, and their immediate descendants. The next in number are the Methodists, (1,650,217 in number), who are divided into several bodies, holding in general the same doctrines, but differing in their ideas of church government, lay representation, itinerancy, &c. There is a small number of churches, some of them composed mostly of Welsh and their descendants, which, while holding Calvinistic doctrines, adhere to the Methodist church polity, and are known as Calvinistic or Congregational Methodists. The Methodists are the leading denominations in the middle, southern, south-western, and western states, and perhaps also in the Pacific states and the territories; and in New England they occupy either the second or third rank. The Baptists, numbering 1,231,877, are next to the Methodists in numerical order, and they, too, are divided into several denominations. The regular or restricted communion Baptists are by far the most numerous, and occupy the second rank in numbers in the southern, south-western, and western states, and perhaps also in New England. The Freewill Baptists are confined to the northern and north-western states; the Seventh Day Baptists and Six Principle Baptists are mostly confined to Rhode Island, Connecticut, and New York. The Church of God, or Winebrennarians, differ but slightly from the regular Baptists; they are found principally in Pennsylvania. The Mennonites are confined almost exclusively to Pennsylvania, Ohio, Virginia, and New York. The Dunkers or Tunkers are found in the same states. The 'Disciples,' or followers of Alexander Campbell, also practise immersion, but are not usually reckoned among the Baptists; they are found mostly in Virginia, Kentucky, Ohio, Pennsylvania, Indiana, Illinois, and Tennessee. The Presbyterian bodies come next to the Baptists, numbering 654,240. The largest and wealthiest is the Old School Presbyterian Church, which has its largest membership in the middle, southern, and south-western states. The Protestant Reformed Dutch Church flourishes principally in New York and New Jersey; the German Reformed Church in Pennsylvania, Maryland, North Carolina, and Ohio; and the Lutherans, consisting mostly of German, Swedish, and Danish immigrants, in Pennsylvania, Ohio, New York, North and South Carolina, Virginia, Maryland, Indiana, Illinois, Missouri, and Wisconsin. The Protestant Episcopal Church, though having a smaller number of communicants than most of those previously mentioned, is a prominent and influential denomination. Before the revolution it was the established church of New York and Virginia; and it is still one of the leading denominations in those states, as well as in Maryland, Connecticut, and Pennsylvania. The Congregationalists are divided into two bodies, the Orthodox or Trinitarian, and the Unitarian Congregationalists. The former are the leading denomination in the New England states, and have a considerable number of churches in New York and in each of the western and Pacific states, but very few elsewhere. The Unitarian Congregationalists are most numerous in Massachusetts, but have some large congregations, mostly in the cities and larger towns in Maine, New Hampshire, New York, Vermont, Connecticut, &c. The denomination taking the distinctive name of Christians, and found in nearly all the states, may be described as Unitarian Baptists, with a church government somewhat resembling that of the Methodists. The Universalists are mostly in the New England states. They are divided into two bodies, the Restorationists and the Universalists proper, whose comparative numbers are not known. The Friends or Quakers are divided into two bodies, the Orthodox or Trinitarian, and the Hicksite or Unitarian Friends. Of late years a large number of persons have become believers in the phenomena known as spiritual manifestations or communications, and in many instances have formed themselves into congregations for religious worship in accordance with the views promulgated by so-called spiritual mediums. These organizations, however, include but a small part of those who have become more or less attracted by spiritualism, and hence it is impossible to give any estimate of their actual numbers. Of the minor sects

not affiliated with the leading denominations, may be named the Moravians, or 'United Brethren in Christ,' principally found in Ohio, Pennsylvania, and Indiana; the new Jerusalem Church of Swedenborgians, in Massachusetts, and in most of the large cities of the country; the Shakers, who have congregations in five or six states; and the Mormons, mostly in Utah territory, where they form an isolated community. Jewish congregations exist in most of the larger towns of the Union, the total number of Jews in the States being estimated at above 200,000. They consist principally of immigrants from Germany and Poland. The most important synagogues are those of New York, Philadelphia, Baltimore, Cincinnati, San Francisco, New Orleans, and Charleston.

The salaries of the clergy are generally sufficient for their support, and even in the smallest villages or rural districts materially exceed those of a large proportion of the country curates of England, the priests of the smaller communes of France, or the lowest class of the clergy of Germany, Switzerland, and Denmark. The average salary of Congregational and Presbyterian ministers is said to be 700 dollars; of the Reformed Dutch, and Episcopal clergy about 600 dollars; of Baptist ministers, about 500 dollars; of Methodist ministers, 400 dollars; and of the Roman Catholic clergy, 500 dollars.

Education, &c.—The system of public instruction in the States originated with the pilgrim fathers of New England; where, as early as 1628, provision was made for the education of 'every child' in the settlements. In 1637 a school was ordered to be provided for every neighbourhood of fifty families, and another for a higher grade of instruction for every 100 families. A sum sufficient to maintain these schools was annually raised by a town tax, voluntarily imposed, and each district drew its proportion of the whole sum for its own school or schools. Thus the property of the town was made liable for the education of the children.

The same system, with various modifications, has gradually extended itself to most of the states in the Union, and in part has been acted upon by the general government. Education in the North has thus become very generally diffused, and the number of native inhabitants of the New England states who cannot at least read and write is very small. In the middle states the large influx of foreign population, a considerable proportion of whom are indifferent to the education of their children, has made the proportion of uneducated persons somewhat greater. In the southern or planting states the population is too widely scattered to admit of successful public schools except in the cities. The negro population is necessarily characterized by the grossest ignorance, it having been, before the emancipation, a penal offence to teach negroes to read. In the western states ample provision is made for elementary education. In all the new states one, and in some of them two, sections of land (each of 640 acres) in each township of government lands are reserved for school purposes, and the states have also grants of swamp and other lands for school funds, and for the establishment of state universities. The people generally appreciate the advantages of this elementary education, and great sacrifices are often made to establish and maintain good and accessible schools. That these schools, even in those states which are furthest advanced, are as efficient or thorough in their education as they should be is not probable; but they have made very great improvement within the past twenty years, and are still advancing. In what is sometimes called secondary education, embracing a very wide range, from the select school or village academy, which is often mainly occupied with rudimentary studies, to the high school, institute, seminary, or collegiate school (so called), the number of establishments is, in the older states, sufficiently large, though in many of them the instruction might be improved. In the northern states the tendency is to the organization of graded schools, equal in their course of instruction and teaching to the best academies; three, four, or more grammar-schools; and a still larger number of intermediate and primary schools, all supported by tax on property, and the allowance from the school fund. The pupil, entering the primary school at five or six years of age, may pass, by successive examinations, to the highest department; and there being no charge for tuition, the child of the poorest citizen enjoys the same opportunities of education, up to the completion of the high-school course, as the child of the rich. In some of the states this system is carried still further by the organization of free state universities. The greater part of the secondary instruction is, however, imparted in incorporated or private seminaries, academies, institutes, or collegiate schools, the price of tuition varying with the location, reputation, number of teachers, &c. Most of these schools are well conducted, and impart a thorough and judicious course of instruction. The number of colleges in the United States in 1861 was about 130. They differ greatly in the extent and thoroughness of their course of instruction, some being little more than academies giving an elementary course in mathematics and classics, while others are nearly equal to some of the best classical schools in Europe in their requirements. A few are universities, having connected with them departments for professional or scientific study, well supplied with the means of imparting instruction in law, medicine, theology, physical science, mathematics, &c. Several of the states have state universities, or institutions bearing that name, though not yet fully organized; but there is no national university. Most of the colleges, including some of the best, were founded and are maintained mainly by particular religious denominations. The best in the country—Harvard College, Massachusetts—is chiefly under the control of the Unitarians. There are nearly sixty theological schools and seminaries, of which twenty are connected colleges and universities, and the remainder independent; about twenty-four law schools, of which sixteen are connected as above; about fifty medical schools, of which nearly one-half are departments of universities or colleges; and ten or twelve scientific schools. Maine has one pupil at school to every 3·2 of the whole population, being a greater proportion than in any other state or country. In the whole United States the proportion at schools is 1 to 4·9, which is greater than in any other country in the world except Denmark, where the proportion is 1 to 4·6.

In the other accessories of superior education, such as libraries, popular and scientific courses of lectures, scientific journals, &c., the United States, though necessarily far behind the older states of Europe, have made great progress within the past few years. There are three public libraries containing more than 100,000 volumes each, ten containing over 50,000 volumes, and twenty containing over 30,000. There are no lecture foundations or endowments in the country, except that of the Lowell Institute in Boston, the Graham Lectures in Brooklyn, N.Y., and the Smithsonian Course in connection with the Smithsonian Institution at Washington; but in almost every city or large village courses of lec-

tures, some scientific, others popular and amusing, are delivered every year, and are attended by large numbers. The scientific journals are ably conducted and well supported, and some of them have a high reputation abroad, as well as at home.

The press in the United States exerts a very powerful influence. The greater part of the people read, and most families take at least one newspaper, and many take several, besides magazines. The religious newspaper press of the large cities is characterized by very high literary merits. There is also a local newspaper press, which exerts in the aggregate a considerable influence. There are few villages of 1000 inhabitants in the country which do not support a local newspaper, edited, it may be, with no great ability, yet sufficing for the expression of local sentiments, for the development of local talent, and occasionally forming the mouthpiece of some vigorous and cultivated intellect, which seeks through it to address the community it represents. The number of newspapers in 1850 was 2526; in 1860, 3951. Even the most newly settled states have a greater number than would be supposed possible; California having had ninety-nine in 1859, and Texas eighty-six in 1860.

The charitable and benevolent institutions in the United States are as liberal and extensive as are needed by the requirements of the country, and many of these are conducted on the most approved principles.

History.—This great, powerful, and flourishing confederation, which seems destined to include within its boundaries the fairest regions of that New World which the genius of Columbus threw open to European colonization, originally consisted of thirteen provinces. These were colonized by English and foreign settlers, in the order hereinunder stated:—

Original Provinces.	When Colonized.	By Whom.
1. Virginia, . . .	1607	The English.
2. New York, . . .	1618	The Dutch.
3. Massachusetts, .	1620	English Puritans.
4. New Hampshire, .	1623	English Puritans.
5. Delaware, . . .	1626	Swedes.
6. Connecticut, . .	1633	Emigrants from Massachusetts.
7. Maryland, . . .	1636	Lord Baltimore and Roman Catholics.
8. Rhode Island, . .	1663	Emigrants from Massachusetts.
9. North Carolina. .	1670	Virginian Settlers.
10. South Carolina, .	1670	Virginian Settlers.
11. New Jersey, . .	1670	Dutch and Swedes.
12. Pennsylvania, .	1681	William Penn and Quakers.
13. Georgia, ...	1732	General Oglethorpe and English.

The early annals of each of these states are briefly sketched under their respective heads. It is only needful to add, before entering upon their connected history, that slavery, if not actually introduced, was at least extended and established in the colonies by the English government, which by the treaty of Utrecht, in 1713, had obtained a virtual monopoly of the slave trade.

Their first beginnings gave but little indications of the unexampled prosperity to which they were, in less than a century and a half, to attain. They were hampered in their development by two persistent enemies—the Indians and the French. The former inflicted upon them severe losses, but were unable to crush the rising states; the latter, seated in Canada, availed themselves of every war between the mother countries to invade the barrier provinces of New York and New England, literally with fire and sword. It soon became evident that to secure the prosperous growth of the English colonies the French must be dispossessed, and in 1745 they suffered their first great loss in the capture of Louisbourg, which supplied the British forces with a convenient position for operating against Canada. The struggle continued for twenty years, with occasional gleams of good fortune for the French, but with a steady advance on the part of the British, who successively made themselves masters of Ticonderoga, Crown Point, Niagara, and Fort Duquesne (now called Pittsburg). But the greatest achievement was the victory of Wolfe on the heights of Abraham (1759), succeeded by the fall of Quebec. The year 1760 came, and still triumph followed triumph. Montreal was captured; the whole province of Canada was subjugated; and the French power ceased to exist on the river St. Lawrence.

Thus relieved from the pressure of an energetic enemy, and protected by their own increased strength against Indian forays, the States made so rapid a progress in wealth and substantial greatness, that, in a few years, the mother country began to look to them for some degree of assistance in bearing the burdens which she had partly incurred in their behalf. On the other hand, the colonists, animated by a true Anglo-Saxon love of independence, frequently chafed against the commercial policy of the sovereign power; and especially after the peace of 1763, when the attempt to carry out our Navigation Laws, by a rigid prohibition of the contraband trade of the American with the Spanish colonies, produced the liveliest discontent. The trade between Great Britain and her colonies, remarks an accurate writer, had been always based upon principles wholly opposite to those of commercial freedom. The Englishman was forbidden to smoke any other than Virginian-grown tobacco, and the Virginian could wear no other coat than one of English-made cloth. Under an external appearance of loyalty and good feeling, therefore, much angry dissatisfaction prevailed. An open quarrel, however, might have been avoided for many years but for the Stamp Act of 1765; a measure to raise 60,000*l.*, which produced a war-outlay of 100,000,000*l.*

'What mighty contests rise from trivial things!'

By this Act certain stamp duties were imposed upon the American colonies, to come into operation on the 1st of November. The Act was little understood in England at the time, and passed with scarcely any opposition. But in America it fanned into a flame the flickering embers of discontent. The colonists were not represented in the British Parliament; what right, then, had that Parliament to tax them without their consent? The state of Virginia particularly distinguished itself by its vehement denunciations of the policy of the British government, and these denunciations lost none of their effect when couched in the eloquent language of Patrick Henry, a member of the Virginian Assembly, and an orator of considerable power.

Our limits will not permit us to trace the gradual processes of arbitrary rule on the one hand, and bitter jealousy on the other, which eventually terminated in an armed conflict. Resistance to Britain united the different colonies by a common bond, and the first colonial congress of twenty-eight delegates, representing nine colonies, drew up an indignant statement of their grievances and declaration of their rights. The Stamp Act was repealed in 1766; but the mother country still claimed the right of taxing her dependencies, and in 1767 duties

were levied upon glass, red and white lead, paper, painters' colours, and tea. These duties were not to be collected until the 20th of November. That day passed over in tranquillity in Boston; but the inhabitants had previously assembled and resolved to forbear the use of many articles of British produce or manufacture. In 1768 the aspect of affairs was so threatening that a large body of troops, with artillery, was encamped near Boston. The spirit of resistance, however, continued active, and spread from Massachusetts over all the provinces. Some attempts at conciliation were made by the British government, who repealed all the duties except that on tea; but it was against the principle of taxation without representation that the colonists were contending, and they held the one duty to be as effectual a badge of slavery as half-a-dozen.

Meanwhile, blood was being shed. An encounter took place between the citizens of Boston and the military on the 8th of March, 1770. Three persons were killed and eight wounded. It was a street squabble in which both parties were almost equally to blame, but in the excited state of public feeling it was exaggerated into 'a massacre.' The stream was rapidly gathering in force and volume, and was soon destined to overthrow every constitutional barrier. On the night of the 16th of December, 1773, a body of Bostonians seized upon three ships loaded with tea from England, then lying in Boston harbour, and deliberately emptied their cargoes into the waters of the bay. It was the work of three hours; but it was also the opening scene of a war which lasted six years, and whose evil consequences are apparent even in our own day.

To chastise this overt act of rebellion the British government declared Boston no longer a port of entry, and transferred its commerce to Salem, while at the same time it took vigorous measures to assert the supremacy of the crown. A powerful fleet and a body of 10,000 troops were despatched to America. The colonists prepared to resist what they considered the tyranny of the mother country, and drilled with indefatigable ardour, unimpeded by the colonial authorities. The first contest between the two parties took place at Concord, near Lexington, on the evening of the 18th of April, 1775, when a British detachment was defeated by a large body of the colonists, with a loss of 200 or 300 in killed, wounded, and prisoners. Almost simultaneously the forts of Ticonderoga, on Lake George, and Crown Point, on Lake Champlain, both very inadequately garrisoned, were surprised by the Connecticut volunteers. Thus committed to a deadly struggle with Great Britain, the colonists hastily organized a civil government, and a congress of all the states assembled at Philadelphia, which resolved to levy and equip an army of 20,000 men, and appointed GEORGE WASHINGTON to the supreme command.

On the 17th of June Bunker's Hill, near Boston, where an American brigade 1000 strong had entrenched themselves, was attacked and stormed by the British, under Sir William Howe, but with so severe a loss as greatly to discourage the royalists, while it stimulated the spirits of the colonial soldiery. Even at this time, had the policy of Great Britain been directed by a wise and patriotic statesman, peace might have been secured; or had her arms been guided by a general of vigour and ability, submission might have been enforced. But Lord North's government was as incapable of statesman-like views, as his commanders were of any well-designed plan of military and naval operations.

Notwithstanding the remonstrances and warnings of some of the leading English statesmen, the government now determined on crushing by force what they were pleased to designate as the unwarrantable rebellion of the American colonists. In this course of action they were supported by all the influence of the king, whose views of public policy were of the narrowest description, and coloured by a strong tinge of absolutism. Troops were poured into America to the number of 55,000, including 17,000 German mercenaries, with immense supplies of war material. The chief command was intrusted to Sir William Howe, a brave and conscientious officer, but wholly undistinguished by any original military genius.

The Americans on their part prepared for a desperate resistance. They proceeded to levy and equip a considerable army, and appointed General Washington their commander-in-chief. That able and disinterested patriot lost no time in commencing operations. In July, 1775, he undertook the siege of Boston, which the British evacuated in the following March after a stout resistance, and, embarking on board their fleet 1500 'loyal' families, sailed for Halifax. But as a counterpoise to his success, which, moreover, had cost Washington half his army, an expedition undertaken by the Americans in two divisions against Canada, failed with severe loss, and their General Montgomery was killed, and General Arnold wounded, before Quebec.

On July 4, 1776, the Congress took the irrevocable step of declaring the colonies free and independent, and absolved from all allegiance to the British crown. The celebrated Declaration of Independence, written by Thomas Jefferson, and based upon the principle that 'all government derives its just powers from the consent of the governed,' was signed by the delegates of the different states on the same day. Soon afterwards these states adopted constitutions of their own, and organized state-governments, which, in their leading features, have continued to the present day.

In the following August Sir William Howe, with 24,000 British troops, landed on Long Island, about 9 miles from New York, where Washington was lying with a force 17,000 strong. The British general defeated the Americans in a sanguinary battle, August 27, and on the 14th of September Washington evacuated the island, of which the British took immediate possession. On the 12th of November they captured Fort Washington, with its garrison of nearly 3000 men, which was soon afterwards followed by the capture of Fort Lee, on the Jersey shore. Newark, New Brunswick, and the principal towns in New Jersey, fell one after another before the British arms; and had the British commander possessed the genius of a Wolfe or a Wellington, the rebellion must have been crushed in its infancy, and the independence of the states, to the great loss of England herself, been delayed another generation.

But while these disasters were occurring on the Atlantic coast, a gleam of success in the west roused the drooping spirits of the colonists. General Burgoyne, at the head of 7000 British and German troops, with a large force of Canadians and Indians, invaded the colonial territory from Canada, with the view of penetrating into New York, and uniting with Howe on the Hudson, and breaking up the confederacy into two disunited bodies. After capturing Ticonderoga, with its garrison of 3000 men, and overcoming the numerous obstacles thrown in his way by a persevering enemy, he was encountered at Saratoga by a large force under Generals Gates and Arnold. Here, on the 19th of September, a sharp encounter took place, which left the British masters of the field. But the Americans

were so strongly posted that Burgoyne deferred any general attack until the expedition from the Hudson advanced to his succour. He therefore entrenched himself at Saratoga, and awaited the expected diversion in his favour to be made from New York. Here, however, he found himself in great danger of famine; his stores were nearly exhausted; the country was drained of forage and provisions; and while the American army was constantly being reinforced, his own was seriously diminished by the desertions of the Indians and Canadians. In this strait Burgoyne at length resolved on a supreme effort to dislodge the Americans from their position, that he might gain the means of resuming his onward march. At the very time that he came to this fatal resolution, Sir Henry Clinton, with a powerful British force, had successfully advanced to within 160 miles from Burgoyne. But the British generals were unaware of each other's movements, and on the 7th, Burgoyne, with only 6000 men, attacked the American entrenchments. The battle was obstinate and sanguinary, but attended with no more direct result than to compel a change of position on the part of the British, which was successfully effected. There, hemmed in by the enemy, who declined a second encounter, and baffled in all his attempts to strike out a path of escape, the brave and unfortunate Burgoyne lingered, until famine compelled him to capitulate on the 15th of October. On that very evening a messenger arrived from Clinton with an account of his continued successes, and with the tidings that part of his force had penetrated as far as Esopus, within 50 miles of Burgoyne's camp. But it was too late. The convention was signed, and, on the 17th, carried into effect.

It proved to be the turning point of the war. It emboldened the French government to accept the overtures made by the American states, and in February, 1778, a treaty was signed by which France acknowledged the 'Independent United States of America.' This was, of course, tantamount to a declaration of war against England, and as England had given the French government no offence, was an act of perfidious policy justly punished, a few years later, by the revolution —a revolution largely fomented by the American principles of equality and liberty, and encouraged by the success of the American rebellion. Louis XVI. and his ministers sowed the wind and reaped the whirlwind.

Though engaged at home in a desperate conflict with France, Spain, and Holland, Great Britain continued for some years her attempts to reconquer the revolted colonies; and that she was unsuccessful resulted rather from the incompetence of her generals than from the assistance rendered to the colonists by the French, or the vigorous exertions of the colonists themselves. The British troops were successful on almost every battle-field; but the victories won by their courage were neutralized by the incapacity of their commanders, who seemed unable to form any definite or combined plans of action, and frittered away their resources in attacks upon isolated points, where success was not worth having, because it produced no result on the general course of events. At length, Lord Cornwallis with an army of 17,000 men found himself shut up at Yorktown, blockaded by a French fleet under the Comte de Grasse, and besieged by a largely superior force of French and Americans. On the 19th of October, 1781, he was compelled to surrender. From this blow the British never recovered. The government at home, pressed by the feeling of the country, relinquished the unequal struggle; negotiations were opened with the

Americans, and the independence of the colonies acknowledged by a treaty signed September 13, 1783.

The States had thus conquered their freedom, but they found themselves hampered with a foreign debt of 8,000,000 dollars, a home debt of 30,000,000 dollars, a discontented army clamouring for arrears of pay, a bankrupt treasury, and a worthless paper currency. So great was the exhaustion, so complete the disorganization, that the historian may reasonably doubt whether, if the struggle had lasted another twelvemonth, the Americans would not have been forced to succumb. Their leading statesmen, however, addressed themselves with vigour to the re-organization of the government. Delegates were summoned from all the states in 1787 to determine a new constitution, which is still the foundation of the American executive power and the guarantee of state-rights and individual liberties. Through the efforts of Hamilton, Jay, and Madison it was finally adopted by all the states, though by some with great reluctance. Two parties arose, the Federalists and the Anti-federalists, the latter contending for the sovereign rights of the states as independent of the central executive; but the former, headed by Washington and John Adams, proved successful. George Washington was elected first president of the United States in 1789, and John Adams first vice-president. Thomas Jefferson was appointed secretary of state; Alexander Hamilton, secretary of the treasury; General Knox, secretary of war; and John Jay, chief justice of the Supreme Court. Thus did the United States enter upon their career as an independent and sovereign nation, destined to an almost unlimited expansion, and a career of the most extraordinary prosperity. It would be wrong, however, to attribute that prosperity to any superior excellence in its mode of government, or to any other than its true causes: the innate energy and industry of a people of British origin, and an immense virgin territory, whose resources it will take years to develop, and centuries to exhaust.

During the great wars of the French revolution and the Napoleonic empire, the United States remained neutral, though a large party did not hesitate to give constant expression to the hostile feelings with which they regarded Britain, the great champion of the liberties of nations, and seized every opportunity of vilifying her conduct and disparaging her exertions.

Washington, after being re-elected to the presidency in 1792, retired from active life in 1796, and was succeeded by John Adams. In 1799 the death of Washington called forth the regrets of all classes of his countrymen, and in the following year the seat of government was removed to the city which he had selected for the capital, and which was named after him in commemoration of his virtues and services. Thomas Jefferson was elected president in 1801, and under his rule the United States made rapid progress. Tennessee, Vermont, Maine, and Ohio were admitted into the Union, which was greatly increased in area and resources in 1803 by the purchase of Louisiana from France for 15,000,000 dollars. In 1805 Jefferson was re-elected president. He declined the honour when offered to him a third time in 1809, and James Madison was nominated in his place. Considerable ill-feeling had now arisen between the American and British governments, owing to the right of search of neutral ships claimed by the latter, and at length this irritation culminated in a declaration of war issued by the United States, June 18, 1812.

The British government, perhaps undervaluing their opponents, and at all events engaged in a life and death struggle with Napoleon, and half Europe at his back,

entered upon hostilities in no very energetic spirit. The ships of war which they fitted out against the Americans were ill-fitted to contend with their far more powerful vessels, and consequently the maritime supremacy of Great Britain seemed for a time in danger of becoming a thing of the past. Ultimately the old flag recovered her prestige, as will be seen from the following summary of the principal naval engagements between the two combatants:—

June 23, 1812.—Between the *Belvidera*, an English frigate of thirty-six guns, 946 tons, and 230 men; and the *President*, American, fifty-six guns, 1540 tons, and 475 men, accompanied by the thirty-six-gun frigate *Congress*. The *Belvidera* succeeded in making her escape into Halifax harbour.

August 13.—The *Essex*, American, forty-six guns, 328 men, 827 tons, captured the English sixteen-gun sloop *Alert*, eighty-six men.

August 19.—The *Guerrière*, forty-eight guns, throwing a broadside weight of metal of 517 lbs., 244 men, and 1092 tons, was captured, after a severe action, by the American *Constitution*, fifty-six guns, broadside weight of metal, 768 lbs., 460 men, and 1533 tons.

October 18.—Between the English eighteen-gun sloop *Frolic*, throwing 262 lbs. broadside weight of metal, ninety-two men, and 384 tons, and the American eighteen-gun sloop *Wasp*, 268 lbs., 138 men, 434 tons. The former was captured after a desperate resistance.

October 12.—Between the *Macedonian*, English, and *United States*, American. The former, after losing thirty-six men killed, and sixty-eight wounded, surrendered. Relative strength of combatants:—

	Macedonian.	United States.
Broadside guns,	24	28
Weight of metal,	528 lbs.	864 lbs.
Crew,	254	474
Tonnage,	1081	1533

December 27.—The *Java*, English, was captured by the *Constitution*, American. Relative strength as under:

	Java.	Constitution.
Guns,	46	56
Crew,	397	460

February 14, 1813.—Between the American *Hornet* and the British *Peacock*. The latter was sunk. Relative strength as under:—

	Peacock.	Hornet.
Broadside guns,	9	10
Weight of metal,	192 lbs.	297 lbs.
Crew,	110	162
Tonnage,	386	460

June 1.—Between the English *Shannon* and the American *Chesapeake*, off Boston Harbour. The latter was captured after a brisk engagement of about twenty minutes, and the victory excited great enthusiasm in England, from the fact that the American was superior in strength, and that it was won by sheer gallantry and good seamanship. The *Shannon* had twenty-four killed and fifty-nine wounded; the *Chesapeake*, sixty-one killed and ninety-nine wounded. The relative strength of the two combatants is thus estimated by our naval historian, Mr. James:—

	Shannon.	Chesapeake.
Broadside guns,	25	25
Weight of metal,	538 lbs.	590 lbs.
Crew,	306	376
Tonnage,	1066	1135

August 12.—Between the *Pelican*, British, eighteen guns and 101 men, and the *Argus*, American, twenty guns, 122 men. The latter was captured.

September 5.—The American sixteen-gun brig *Enterprise*, 120 men, captured the British fourteen-gun brig-sloop *Boxer*, with a crew of only sixty men.

March 28, 1814.—The British thirty-six-gun frigate *Phœbe* captured the American thirty-two-gun frigate *Essex*.

April 29.—The British *Epervier*, eighteen guns and 101 men, surrendered to the American *Peacock*, twenty-two guns and 185 men.

June 28.—The British eighteen-gun brig *Reindeer* was captured by the American twenty-two-gun brig-sloop *Wasp*.

September 1.—A desperate engagement took place between the British eighteen-gun brig-sloop *Avon*, 104 men, and the American twenty-two-gun ship-sloop *Wasp*, with a crew of upwards of 200 men. The *Avon* was sunk in the action, but her crew were saved by the British eighteen-gun brig-sloop *Castilian*, on whose arrival the *Wasp* made all sail and escaped.

February 23.—Between the British forty-six-gun frigate *Pique*, 284 men, and the *Constitution*, American, fifty-six guns, and 580 men. The latter discontinued the engagement and made her escape, the *Pique* being too crippled to pursue her formidable antagonist.

January 15, 1815.—Between the American frigate *President* and the English *Endymion*, accompanied by the *Pomone* and *Tenedos*. The action was fought by the *Endymion*, but the *President* surrendered to the *Pomone*, which came up at its close. The *President* carried twenty-eight broadside guns, throwing 852 lbs. weight of metal, and her crew consisted of 465 men. The *Endymion's* twenty-four broadside guns threw only 664 lbs., and she had but 319 men.

It will thus be seen that the American victories at sea were entirely due to a preponderating superiority of force. Their frigates were, in reality, men-of-war, with which the British frigates could not cope on anything like terms of equality. But when the British government gradually became aware of this serious fact, and despatched heavier armed ships into the American waters, our seamen soon vindicated their ancient renown.

Meanwhile, the war had been prosecuted on land with varying fortune. Two invasions of Canada were defeated by the British, but in 1812 the campaign on the lakes was in favour of the Americans, and the British squadron on Lake Erie, of six vessels and sixty-three guns, was captured by Commodore Perry, with a flotilla of nine vessels and eighty-four guns. In 1813 another attempt at invading Canada proved unsuccessful. In 1814 Generals Scott and Ripley crossed the Niagara, and two sharp but indecisive actions took place at Chippewa and Lundy's Lane. A British invasion, by Lake Champlain, under General Sir George Prevost, with 14,000 men and a flotilla on the lake, was defeated with severe loss. On the other hand a British fleet ascended the Chesapeake, defeated the Americans at Bladensburg (August 14), captured Washington and destroyed its public buildings (August 24), but failed in a subsequent attack on Baltimore (September 12). An expedition against New Orleans, headed by General Packenham, was repulsed with a loss of 700 killed and 1000 wounded, owing to the incompetency of the arrangements and the headstrong arrogance of the authorities, which resulted in entangling the British force in a fatal ambuscade (January 8, 1815). Neither party in this fratricidal war can be said to have gained much glory, and in the United States a large body of citizens felt its folly and

deplored its disasters. The New England states threatened a secession if the struggle, which, owing to the vast superiority of the British navy, proved ruinous to American commerce, were not terminated, and as public opinion in England was scarcely less favourable to peace, a treaty was concluded between the two governments in December, 1814. The news, however, did not reach America in time to prevent the calamity at New Orleans.

In 1817 James Monroe was elected president; and about this time commenced that enormous annual emigration to the States which has enabled them to attain such colossal proportions in so short a period, and which has extended their territory westward to the foot of the Rocky mountains, and southward to the frontiers of Mexico. In two years six new states were added to the Union. A quarrel with Spain, originating in the support lent to the Seminole Indians by the Spanish authorities, resulted, in 1819, in the cession of Florida. In 1820 Alabama, a slave state, and Maine, a free state, were incorporated; and from this epoch may be dated the growth of that great struggle between the southern states, as representing slavery, and the northern and middle, as identified with freedom and free labour, which was finally terminated by the Civil War. As each incorporation of a slave state increased the slave influence in Congress, the struggle to maintain the balance of power was being perpetually waged. To this it must be added that the slave states were agricultural, and consequently advocates of free trade; the free states, manufacturing and commercial, and champions of protection. Thus the two great divisions of the Union were animated by directly opposite principles, and contended for hostile interests, and a line of demarcation existed between them almost as distinct as if drawn between two alien nations. A kind of compromise was established in 1820, on the admission into the Union of the slave state Missouri, with a view of neutralizing this inconvenient antagonism, and it was provided that no slave state should thereafter be erected north of the parallel 36° 30′ N. lat., the northern boundary of Arkansas.

Mr. Monroe was a second time elected president in 1820. In 1824 he retired, and was succeeded by John Quincy Adams, with John C. Calhoun, an eloquent pro-slavery statesman, and a Southerner of great ability, as vice-president. The struggle between the Republican and the Democratic parties, as they were strangely and inconsistently called, continued throughout his term of government; but the Democrats triumphed at the presidential election of 1828, and carried their candidates, General Andrew Jackson, the 'hero of New Orleans;' and John C. Calhoun, as, respectively, president and vice-president.

General Jackson was a vigorous ruler, and his popularity secured for him a second lease of office in 1832, with Martin Van Buren as vice-president. In 1837 the latter rose to the presidency, which was distinguished by his firmness, moderation, and dignified policy. He incurred much unpopularity among the noisier classes of politicians by refusing to show any sympathy with the Canadian insurgents in 1837–38, and in 1840 gave place to General Harrison, as the representative of Whig principles. Fatigue and excitement proved fatal to the new president in a month after his election, and he was succeeded by the vice-president, John Tyler. During his period of government a serious difficulty arose with England on the Oregon boundary question, but it was amicably settled through the exertions of Daniel Webster, the American secretary of state, and Lord Ashburton, the British commissioner. A treaty defining the boundaries between the British and American territories, suppressing the slave trade, and providing for the extradition of fugitive criminals, was signed at Washington, August 9, 1842.

Internal struggles next called for the president's attention. Texas, largely colonized by American settlers, revolted against Mexico, and asserted its independence, which was acknowledged by France, England, and the United States. It soon afterwards demanded admission into the Union. Its appeal was strongly supported by the southern states, because its annexation would strengthen the influence of the pro-slavery party; and strongly opposed, for the same reason, by the Northerners, who also saw that it would involve a war with Mexico. The lust of territory, which seems the besetting sin of the great republic, finally prevailed. In 1845 Texas was formally annexed; war was declared by Mexico; and James Polk, of Tennessee, succeeded Mr. Tyler in the presidency.

The Mexicans crossed the Rio Grande, and commenced hostilities, on the 26th of April. They were promptly encountered by the American army, under General Zachary Taylor, who pushed forward with equal vigour, celerity, and success, defeating the Mexicans at Palo Alto, Monterey, and Saltillo, and finally, with 4759 men against 20,000, winning the desperate battle of Buena Vista, February 22 and 23, 1847. An expedition under General Scott landed at Vera Cruz, which was taken by storm on the 29th of March, and on the 18th of April General Santa Anna, the Mexican leader, with 15,000 men, was defeated by General Scott and his 9000 troops, with heavy loss. This was followed by the victories of Contreras (August 19) and Churubasco (August 20), and the capture of Mexico (September 9), which terminated the war. A treaty of peace was signed on the 29th of May, 1848, by which the United States obtained the cession of New Mexico and Upper California. But the acquisition of these territories increased the vehemence of party feeling throughout the Union, the North loudly demanding that slavery should not be introduced where it had not previously existed. In the presidential election of 1849 the South, however, succeeded in carrying General Taylor as president, and Millard Fillmore as vice-president, and the political struggle grew so violent as to menace a disruption of the Union. General Taylor died in 1850, and was succeeded by Mr. Fillmore, under whom the South contrived to pass the Fugitive Slave Act, providing for the rendition of slaves who escaped into the free states.

The South won another triumph in 1852, when Franklin Pierce was appointed president, and Jefferson Davis, a prominent pro-slavery politician, secretary of war. The repeal of the Missouri compromise, and the debates relative to the admission of Kansas into the Union, inflamed the bitter feeling already existing between the two great factions, and led to many deeds of violent outrage. Some attempts were made by the government to divert the current of public opinion by fomenting little quarrels with Great Britain, as in 1852; again in 1856, during the Crimean war, when Mr. Crampton, the British ambassador, was dismissed; and in 1859, on the Vancouver's Island question: but the moderation of Great Britain, and the good sense of the more enlightened classes in the States, prevented these difficulties from terminating in war.

Meanwhile, the struggle between North and South continued to increase in force and intensity. Though the power of the latter seemed paramount, when, in 1856,

two well-known pro-slavery men, James Buchanan and John C. Breckenridge, were respectively elected president and vice-president; yet from this time it became evident to many sagacious and far-seeing politicians that the quarrel between the two divisions of the Union could only be settled by the arbitrament of arms, or by the secession of one of the hostile factions. The angry feeling was raised to blood-heat in December, 1859, by the execution of John Brown, at Harper's Ferry, for his share in an expedition for freeing the slaves in Virginia. Though he was unquestionably an insurgent, in arms against the lawful government of his country, the abolitionists regarded him as a martyr in a high and holy cause, and honoured his body with a public funeral.

The year 1860 opened stormily, and both parties prepared for a grand trial of strength at the approaching presidential election—a trial which should be regarded as a definitive conclusion of the struggle of half a century. It was about this time (September and October) that the prince of Wales visited the States, where he was received with a very cordial and enthusiastic welcome.

The election took place on the 6th of November, and resulted in the triumph of the North: Abraham Lincoln was named president, and Mr. Hamlin vice-president. The South immediately acted upon the menace it had previously addressed to the North, and withdrew from the Union; the example set by South Carolina, on the 20th of December, being followed by Mississippi, January 8, 1861; Florida, January 10; Alabama, January 11; and Georgia, January 19. They were joined at a later period by Virginia, North Carolina, Tennessee, and Arkansas. Kentucky and Missouri were divided between the contending sections.

On the 4th of February delegates from Alabama, Florida, Mississippi, Georgia, Louisiana, and Texas met at Montgomery, and formed a provisional government, under the title of the 'Confederate States of America.' Jefferson Davis, of Mississippi, was elected president, and Alexander H. Stephens, of Georgia, vice-president. President Davis immediately prepared for war, and blockaded Fort Sumter, in Charleston Harbour, which surrendered on the 13th of April.

At first the North appeared paralyzed by this untoward event, and some of its leading statesmen advocated that the seceding states should be allowed to depart in peace. But soon the public began to recognize the full importance of the fact, and to see that a slave republic south of the Potomac would be an inconvenient and even a dangerous neighbour, while the division of the Union must necessarily impair its prestige abroad, and weaken its influence as a sovereign power. President Lincoln therefore prepared to compel the return of the insurgent states, and proclaimed a blockade of their ports, April 19. This was followed by a declaration of neutrality on the part of Great Britain, May 13, and of France, June 10. The other European powers also announced their intention of remaining neutral during the coming war.

This terrible tragedy is still of such recent date that it is impossible for the historian to regard it with perfect coolness and impartiality, while the magnitude of its scenes precludes the idea of our attempting to describe them fairly and fully in the limited space at our disposal. It seems to us, therefore, that we shall best consult the convenience of our readers by placing before them a summary of the more important events in chronological order. Few but will have followed the exciting narratives which, month after month, appeared in *The Times* and other journals, from the pens of able and well-informed correspondents; and the plainest enumeration of dates and names will suffice to recal to their memories the leading incidents of the colossal struggle.

In Missouri the Federal army, under General Lyon, was successful in successive engagements at Carthage, July 5, and Athens, August 5. But these advantages were more than counterbalanced by the surrender of Lexington to the Confederates, September 20, 1861.

In Virginia the Federals, under General M'Dowell, were defeated at Big Bethell, June 10, 1861; and sustained a far more serious repulse at Bull's Run, or Manassas, July 21, ending in a complete rout. The Federals lost 481 killed, 1011 wounded, and 1216 missing; the Confederates, under Generals Johnston and Beauregard, 1500. It is believed that, had they at once marched upon Washington, the capital must have fallen.

October 21, 1861.— Battle of Bull's Bluff, and defeat of the Federals.

November 1, 1861.—General George M'Clellan was appointed commander-in-chief of the Federal army; and the Federal government, recognizing the full extent and importance of the struggle, began their military preparations on a vast scale.

November 8.—Captain Wilkes, of the Federal war steamer *San Jacinto*, boarded the Royal British mail-packet *Trent*, and carried off two Confederate delegates, Messrs. Mason and Slidell. This insult to our flag excited great indignation in England, and the release of the delegates was imperatively demanded. After a brief hesitation the Federal government complied, and Mason and Slidell sailed for Europe, January 1, 1862.

November 30.—Mr. Jefferson Davis was elected president of the Confederate states for a term of six years. At this date the Federals had in the field a force of 660,971 men, had blockaded the Confederate coast, and were preparing for the siege of Charleston and other important harbours, so as to prevent the Confederates from importing military stores, &c.

February, 1862.—The operations of the Federal army in Tennessee were attended with great success, and the Confederates were successively defeated at Fort Henry, Fort Donnelson, and Nashville.

March 9.—Engagement in Hampton Roads between the Confederate iron-plated ship *Merrimac* and a Federal squadron. The Federal ships *Cumberland* and *Congress* were destroyed (March 8), but on the following day the *Merrimac* was defeated by the Federal iron-plated floating battery *Monitor*.

March 20.—The army of the Potomac, under M'Clellan, crosses that river, and marches against Richmond. At the same time an expedition, under General Burnside, is despatched to North Carolina, and wins the battle of Winchester, March 23.

April 5.—M'Clellan continues his advance against Richmond, the seat of the Confederate government, and invests Yorktown, which is held by 30,000 Confederates.

April 6 and 7.—The Confederates retrieve their disasters in the west, and defeat the Federals in the great and sanguinary battles of Shiloh, near Corinth, Tennessee; but their success is dearly purchased by the loss of one of their ablest commanders, General Albert Johnston.

April 26–28.—A heavy blow to the Confederate cause is dealt by the capture of New Orleans, which shuts against them one great source of supply from Europe.

May 11.—They suffer another severe misfortune in being compelled to surrender their naval depôt at Norfolk, Virginia, and burn their iron-clad ship *Merrimac*.

They are harassed in the west by Commodore Farragut's ascent of the Mississippi with a powerful flotilla, which, in conjunction with Halleck's army, captures Memphis, June 6. Beauregard and the Confederate army are compelled to retreat.

June.—In Virginia, however, the Confederates, under General Robert Lee, are successful, and M'Clellan's army sustains serious losses.

June 26–July 1.—A seven days' conflict takes place on the Chickahominy, in front of Richmond, terminating in the complete repulse of M'Clellan, who abandons the siege, retreats 17 miles, and takes up a position on James' River, where the discouraged Federals were visited by President Lincoln. The president asks for 300,000 volunteers.

July 14.—The command of the Federal army in Virginia is assumed by General Pope, whose lieutenant, General Banks, is defeated at Cedar Mountain, August 9, by General Thomas Jefferson Jackson, better known as 'Stonewall Jackson,' in allusion to his steady intrepidity.

August 16.—M'Clellan retreats from the James River, having lost in his disastrous campaign 70,000 killed, wounded, missing, and prisoners.

August 29.—By a skilful movement Stonewall Jackson turns the flank of Pope's army, and attacks him at Groveton. On the 30th General Lee rapidly moves up his army from Richmond, and reinforcing Jackson, renews the attack upon the Federals, who retreat, after suffering heavy losses, to Centreville. There they are once more routed (September 1), and the broken remnants of their army flee in disorder to take refuge behind the lines of Washington.

September 5, 6.—Washington was now at the mercy of the Confederates, but the Federals proved equal to the crisis, and M'Clellan, appointed commander-in-chief, rapidly concentrated a powerful force, and advanced against Lee, who had crossed the Potomac, and entered Maryland, where a strong Confederate feeling was supposed to exist. He was reinforced by Jackson on the 15th, who had captured Harper's Ferry.

This was the climax of Confederate success. In the west the Federals were defeated at Lexington and Munfordville, and President Davis appointed the 18th of September for a day of national thanksgiving.

Had Lee pushed on to Washington, the result of the war might have been different. He soon found Maryland indisposed to rise in his behalf, and collecting immense booty, re-entered Virginia, September 22.

September 22.—On the same day President Lincoln issued his famous declaration abolishing slavery in the Confederate states, on and after January 1, 1863, if they had not returned to their allegiance before that date.

October 10–13.—The Confederate general Stuart made his celebrated cavalry raid into Pennsylvania; riding in a complete circuit round the Federal camp, and returning to his own lines laden with booty. A scarcely less successful raid was accomplished in Kentucky, October 18, by the Confederate general Morgan.

October–December.—Much alarm was excited in New York by the depredations upon American commerce committed by the Confederate steamer *Alabama*, Captain Semmes. An angry feeling against Great Britain was also caused by a belief that the British government might have prevented the departure of the *Alabama* from Liverpool, where, in defiance of the neutrality laws, she had been equipped by Mr. Laird, the Birkenhead shipbuilder.

November 7.—The slow movements and want of success of General M'Clellan led to his removal from the command of the army of the Potomac, which was intrusted to Burnside, who summoned Fredericksburg to surrender, November 22, bombarded it, December 11, assaulted the Confederate position, and was beaten back with terrible slaughter, December 13. Broken and discouraged, the Federals once more abandoned the advance against Richmond.

January 2, 1863.—But while thus unsuccessful in Virginia, they were winning victories in the west which eventually proved of the highest importance to their cause. After a series of engagements near Murfreesboro', the Federals, under General Rosencranz, compelled the Confederate general Bragg to retreat.

January 26.—General Joseph Hooker superseded Burnside in command of the army of the Potomac, which, largely reinforced, crossed the Rappahannock, April 28. Its right wing was hotly attacked and completely defeated by Stonewall Jackson, May 1, who, unfortunately, was mortally wounded by his own party firing on him by mistake. General Stuart took the command; and after desperate fighting on May 14, the Federals were once more compelled to re-cross the Rappahannock. Jackson died, May 9, lamented both by friends and foes.

May.—These disasters were more than balanced by the Federal successes in Tennessee, where Grant defeated the Confederate general Joseph Johnston at Jackson, May 14; and Pemberton, at Champion Hills, May 16. He then invested the strongly-fortified town of Vicksburg. A formidable assault was repulsed by the Confederates, May 2; but Commodore Porter bringing his ships up the Mississippi, and the town being thus completely invested, General Pemberton was forced to surrender on the 4th of July.

June 16–30.—General Lee invaded Pennsylvania and Maryland, captured several towns, and collected immense stores. The Federals, under General Meade, who had superseded Hooker, advanced against him, and the desperate battle of Gettysburg was fought, July 1–3. Neither side could claim a victory, and the loss was about equal—15,000 killed and wounded. But the Confederates were unable to obtain reinforcements, and greatly weakened, retreated into their own territory.

July.—Siege of Charleston, which was vigorously defended by Beauregard. The Federals attacked, bombarded, and destroyed Fort Sumter, August 21, 22, but were defeated in an attempt to occupy the ruins.

September 10.—Battle of Chickamauga, Tennessee. Rosencranz defeated by the Confederate general Bragg. Grant, Thomas, and Sherman soon afterwards took command of the Federal forces in the west, and Sherman and Thomas inflicted a severe defeat on Bragg at Chattanooga, November 2, 3. The Confederates were now beginning to suffer from want of men and military munitions, while the Federals were able to reinforce their armies in large numbers, and their resources were comparatively inexhaustible. The Confederate general Bragg was superseded by Hardee, December 2, while the command of the army in Georgia was intrusted to General Joseph Johnston, December 27.

February 1, 1864.—President Lincoln orders a draft of 500,000 men, to be levied over a period of three years. General Ulysses Grant was appointed commander-in-chief, March 2. Now began the twofold operations of the Federal forces, Sherman attacking the Confederacy in the flank, while Grant moved against its heart, Richmond; and it will be seen that, despite of severe disasters, the steadfast persistency of the Federals and their overwhelming numbers proved eventually successful.

The Confederate authorities were aware of their danger, and called every man into the field that could bear arms. Lee, to check Grant's advance, crossed the Rapidan, May 2, and fought the indecisive battles of the Wilderness, May 5 and 6, and Spottsylvania, May 11 and 12. The carnage was terrible, and Lee, pressed by a heavily preponderant force, was reluctantly compelled to retire upon Richmond. Grant then executed an able flank movement, which placed him on the other side of the Confederate capital, in front of Petersburg; but attacking the Confederates in their intrenchments, was so severely punished, June 18, as to be compelled to a temporary pause. Meanwhile, Sherman, in Georgia, was equally successful, and defeated his opponents at Resacca, May 14, and at Dallas. To fill up the measure of Federal triumph, the *Alabama* was sunk in an engagement with the U.S. corvette *Kearsage*, Captain Winslow, near Cherbourg, France, June 19.

July 1.—To force Grant to withdraw from before Petersburg, Lee invaded Maryland, and defeated Wallace near Monocracy River, July 9. He threatened Baltimore and Washington; but not succeeding in his main object, again retreated, July 13. A second invasion, in which Chambersburg was destroyed, July 30, proved equally without beneficial result to the Confederate cause. But Grant's second attack upon Petersburg, July 30, was defeated with terrible slaughter.

July 20–28.—A series of severe engagements took place at Atlanta, in Georgia, between the hostile armies, in which the victory rested with Sherman, who occupied Atlanta, September 1, and taking advantage of the Confederates' weakness, began his celebrated flank march through Georgia to Savannah. The effect of this masterly movement was to cut the Confederate states in two, and to place an overwhelming force on the Atlantic coast. He reached Savannah early in December, stormed Fort M'Allister, December 13, and captured the town, December 26. At the same time the Federal general Sheridan descended the Shenandoah Valley, so as to threaten Richmond on that side.

February 22, 1865.—Wilmington was captured by Schofield; and Charleston becoming untenable, was evacuated by General Beauregard.

March 31.—Sheridan having now arrived in Lee's front, Grant renewed his attack upon Petersburg, and notwithstanding the desperate heroism of the Confederates, and the able generalship of their commander, they were forced to retreat, April 2. Richmond and Petersburg were evacuated, April 6, and Lee, finding further resistance hopeless, surrendered to General Grant at Appomatox Court-house, April 9. President Davis endeavoured to escape towards the south, but was overtaken and made prisoner at Irwinsville, in Georgia, May 10. He was flung into prison, and only released on bail in the autumn of 1867.

April 12.—Mobile was evacuated by the Confederates.

May 4.—The Confederate general Taylor surrendered.

May 26.—The Confederate general Kirby-Smith, in Texas, surrendered, and this great civil war terminated in the complete prostration of the South. The exultation of the northern states was, however, suddenly overclouded by the assassination of their honest and devoted leader, President Lincoln, who had been re-elected in November, 1864. While seated in his box at Ford's Theatre, Washington, he was shot by a fanatic, named Wilkes Booth; and about the same time, Mr. Seward, the foreign secretary, and his son, were wounded in their own house by an assassin. Both the latter eventually recovered, but Lincoln died at 7.30 on the morning of the 15th April. The vice-president, Andrew Johnson, was then sworn in as president.

Since the close of the four years' struggle the history of the United States has presented no remarkable incidents, and the attention of the two great parties in Congress has been mainly devoted to the important question of re-construction; the radicals deprecating clemency to the South, and distinguishing themselves by an ultra-partiality to the negroes; the democrats, with the president at their head, being desirous of re-admitting the South on moderate terms to the Union. The political struggles that have thence ensued are of too recent occurrence for impartial consideration. We may reasonably hope that time will calm the animosity of either faction, and that the rights of the blacks will be preserved while the claims of the whites are not disregarded. We may also hope that time will subdue the irritation manifested by a large class among the Americans in reference to the *Alabama* question, and that the American republic will learn to believe in the kindly feeling with which Great Britain regards her gigantic offspring. The immense resources of the States have been signally displayed in the rapidity with which they have reduced the debt imposed upon them by the war, and none can doubt that a glorious future awaits them. Great Britain has seen with regret the countenance given by American officials to the leaders of the Fenian movement, but has promptly acknowledged the good faith of the United States government in checking their criminal and causeless forays into Canada. No doubt the daily increasing intercourse between the two nations, the influence of a common literature and religion, and the ties of an ever-extending commerce, will assist the claims of race and the traditions of history in gradually uniting the two great Saxon communities in the bonds of loyal fellowship.

(We have been indebted for much useful commercial and statistical information in the preceding article to *The Resources and Prospects of America*, by Sir M. Peto, Bart., London, 1866. See also Ripley and Dana's *New American Cyclopædia*, vol. xv.; Lippincott's *Gazetteer of the United States*; M'Culloch's *Dictionary of Geography; The Statesman's Year Book*, by F. Martin, London, 1868; *Commercial Relations: Report* of the Secretary of State on the Commercial Relations of the United States with Foreign Countries for the year ending September 30, 1866; Washington, 1867. *Reports* of Mr. Stuart, Secretary of the British Embassy at Washington, on the Revenue, Expenditure, and Public Debt of the United States; and of Messrs. Hemans, Murray, Donohoe, Archibald, and Kortright, British Consuls at Buffalo, Portland, New Orleans, New York, and Philadelphia, on the Trade and Commerce of the United States, in *Commercial Reports received at the Foreign Office*, London, 1866; *The Four Great Powers: England, France, Russia, and America; their Policy, Resources, and Probable Future*; by Rev. C. B. Boynton, D.D., Professor at the United States Naval Academy, Chaplain of the House of Representatives; Cincinnati, 1866; Wedgwood (William B.), *The Government and Laws of the United States*, comprising a complete and comprehensive view of the use, progress, and present organization of the State and National Governments; New York, 1866; Jared Sparks, *History of the United States; Pictorial History of England*; Cooper's *History of the American Navy*; Yonge's *History of the British Navy*; the *Annual Register*; Irving's *Life of Washington*; Hepworth Dixon, *New America*; contemporary newspapers, &c.)

dated the 12th of March, granted to the universities of Oxford and Cambridge the power to send each two representatives to the House of Commons. The University of Dublin also sends two, and by the Reform Bill of 1867 one was assigned to that of London. The Dean and Chapter of Durham, by an act of chapter, 28th of April, 1831, established an academical institution in Durham in connection with the cathedral church, which by an Act of Parliament (2 & 3 Will. IV.), entitled 'An Act to enable the Dean and Chapter of Durham to appropriate part of the property of their church to the establishment of a university in connection therewith for the advancement of learning,' was confirmed and endowed. In 1837 the University of Durham obtained a royal charter. The University of London received its first charter from William IV. [UNIVERSITY OF LONDON.]

UNIVERSITY COLLEGE, LONDON, and LONDON UNIVERSITY. UNIVERSITY COLLEGE, LONDON, had its origin in a project which was first promulgated in the year 1825. The object proposed was to found a university in London by means of public subscription. One of its main purposes, and which was from the first warmly supported by Mr. Brougham (late Lord Brougham), who up to his decease in May, 1868, held the office of president of the council, was to afford the opportunity of obtaining a university education to the various classes of society in England who, not being members of the Church of England, were excluded in a greater or less degree from Oxford and Cambridge.

The proposal was favourably received. In a few months the funds were raised by subscriptions for 100*l.* shares, and by a few donations of 50*l.* each. In the autumn of the same year a freehold site was obtained in Gower Street, for which 30,000*l.* was paid, and the first stone of the building was laid on the 30th of April, 1827, by his Royal Highness the duke of Sussex. By the end of 1828 the institution was in full operation.

In 1830 an application was made to the crown for a charter, but the grant was successfully opposed by the universities of Oxford and Cambridge. In 1833 the application was renewed, as was also the opposition, with the additional opposition of the College of Surgeons; the case was heard before the Privy Council in 1834, but before a decision was obtained a change of government took place, and the question remained undecided, when, in March, 1835, on a motion by Mr. W. Tooke, who at that time was the treasurer of the college, the House of Commons voted an address to his Majesty, in opposition to the ministers, praying him to grant a charter. King William replied that the Privy Council should be called on to report; but still nothing was done until Lord Melbourne again succeeded to office, when, in August, 1835, the chancellor of the Exchequer made a proposal for founding a university of London for the purpose of examining and granting degrees not only to students in this college, but to others of all religious persuasions without distinction, and without the imposition of any test or disqualification whatever. The proposal was agreed to, and carried into effect in the following year, and on the same day this College received a charter under the title of University College, London. From its commencement to this time it had been styled the London University.

The council, consisting of the president, the vice-president, and twenty-one other members, has the general management of the affairs of the college. The Senate consists of the professors of the college, with a president and two vice-presidents, who must be members of the Council. The Senate determines on the courses, and regulates the time of instruction. There are twenty-five professorships in Arts and Laws, and fifteen in the various branches of the medical art. The whole range of college tuition is given, except divinity, with the addition of much fuller instruction in science and modern languages than was before given in colleges. The number of students in attendance in the Faculty of Arts and Laws averages about 340 per annum, and in the Faculty of Medicine about 250. Evening classes have been instituted for others than regular students. None of the professors' chairs are publicly endowed, those gentlemen being remunerated solely by their class fees. Among the past and present professors of Arts and Laws have been such men as Austin (Jurisprudence), Panizzi, Latham, George Long, Ramsay (Geology), Sylvester, A. J. Scott, Key, De Morgan, F. W. Newman, Tom Taylor, Arthur Hugh Clough, David Masson, Malden, Seeley, Williamson, and Henry Morley; and it is no wonder that with such a teaching staff University College has acquired a peculiarly high reputation. Opposite to the college, on part of the ground belonging to it on the west side of Gower Street, is an hospital erected in 1834 by public subscription, chiefly among the proprietors, at the cost of about 10,000*l.*, for the purpose of affording the medical students clinical instruction under the superintendence of the professors and other members of the hospital staff. It is supported by public contributions. The medical school of the college is one of the most celebrated in the kingdom. The past and present medical professors include Sir Charles Bell, Professor Graham (now master of the Mint), Liston (the famous surgeon), Dr. Anthony Todd Thomson, Dr. Lindley, Dr. C. J. B. Williams, Dr. Parkes, Dr. Carpenter, Dr. Jenner, Dr. Sharpey, Dr. J. Russell Reynolds, Professor Quain, Professor Erichsen, Professor Marshall, and Sir Henry Thompson.

The following exhibitions, scholarships, and prizes are in the gift of the college:—

Andrews Exhibitions.—Three entrance exhibitions, called Andrews exhibitions, for candidates not more than eighteen years of age, and not previously students of the college. One is awarded to superior merit in classics, one in mathematics and physics, and the other in classics, mathematics, and physics combined. Each of these exhibitions is of the value of 30*l.* per annum, and is tenable for three years. Every exhibitioner is required to attend in each year three out of the following classes:—Latin, Greek, pure mathematics, applied mathematics, and physics. Admission tickets to these three classes are presented as an equivalent for 20*l.*; the remaining 10*l.* is paid annually in money at the end of each session, provided he shall have attended the three classes regularly throughout the session.

Andrews Prizes.—At the end of the session, two Andrews prizes, of 25*l.* each, in money, are awarded to students of one year's standing, upon the result of the college examinations. One of them is given to the greatest proficient in classics, and the other in mathematics and physics.

Andrews Scholarships.—At the end of the session, two Andrews scholarships, of 50*l.* each, are awarded to students of two years' standing, upon the result of the college examinations. One of them is given to the greatest proficient in classics, and the other in mathematics and physics, who, in each case, states in writing his intention to attend, during the following session, three out of the following classes:—Latin, Greek, pure mathematics, applied mathematics, and physics. Ad-

mission tickets to these three classes are presented to him as an equivalent for 20*l.*; the remaining 30*l.* is paid to him in money at the end of the next session, provided he shall have attended the three classes regularly.

Jews' Commemoration Scholarship.—A scholarship of 15*l.* a year, tenable for two years, is awarded every year to the student of the Faculty of Arts, of not more than one year's standing in the college, whatever be his religious denomination, and wherever he was previously educated, and whose age when he first entered the college did not exceed eighteen years, who is most distinguished by general proficiency and good conduct. This scholarship was founded by the Jews in 1858, to commemorate their admission into Parliament.

The *Joseph Hume Scholarships in Political Economy and Jurisprudence* of 20*l.* a year each, tenable for three years, are competed for every third year. The next competition for the former takes place in November, 1868, and for the latter in 1870.

The *Ricardo Scholarship in Political Economy*, of 20*l.* a year, tenable for three years, is also competed for every third year—the next competition being in 1869.

A College prize of 5*l.* is annually presented by the council, for the best English essay on an historical, biographical, or speculative subject; and the Reading-room Society's prize of 5*l.* for the best Latin prose essay.

The scholarships, exhibitions, medals, and prizes awarded in the Medical School of the college are:—Three entrance exhibitions, of the value of 30*l.*, 20*l.*, and 10*l.* per annum, tenable for two years; the Atkinson-Morley Surgical scholarship, value 45*l.* per annum, which is awarded every year for the promotion of the study of surgery, and is tenable for three years; the Filliter exhibition, a prize of 30*l.*, awarded annually for the encouragement of proficiency in pathological anatomy; the Clinical gold and silver medals founded by Dr. Fellowes, with certificates of honour, awarded at the end of each term to the pupils who shall have most distinguished themselves by reports and observations on the medical cases in the hospital; and the Liston gold medal, with certificates of honour, awarded at the end of the session to the pupils who shall have most distinguished themselves by reports and observations on the surgical cases in the hospital. *Class Medals, &c.*—Gold and silver medals, or other prizes, as well as certificates of honour, are awarded, after competitive examinations, to those students who most distinguish themselves in particular branches of study in the college or hospital.

The school of the college is under the control of the council, and is conducted by a head master appointed by them, who has the rank and privileges of a professor in the college, and by a vice-master. There are about thirty assistant masters and over 400 pupils.

According to the original design the college was to consist of a centre and two wings, forming three sides of a quadrangle. Of these the centre has only been erected, and extends a length of about 400 feet. The front is of two floors, constructed in freestone, with a Corinthian order of pilasters on the upper story. The grand entrance is by a pseudo-triprostyle portico, of rich architectural character, of the Corinthian order, having ten columns in front. It is elevated on a lofty stylobate ascended by flights of steps, and leads to an octangular vestibule surmounted by a dome which externally rises behind the pediment of the portico. The vestibule is now called the Flaxman gallery, having been fitted up for the exhibition of the original casts of most of Flaxman's principal works. The lecture rooms are four semicircular theatres, each 65 feet by 50; four oblong rooms, each 46 feet by 24; with other class-rooms of smaller dimensions. There are two spacious laboratories for chemistry and pharmacy. On each hand of the vestibule on the upper story is a room 120 feet by 50; one of which has been divided into class-rooms for the school; the other, to the north of the portico, has been fitted up as a spacious anatomical museum. The general library, consisting of upwards of 50,000 volumes, occupies a building designed by Professor Donaldson, which stands at right angles to the centre of the main building, and eastward of it. The Chinese library collected by the late Dr. Morrison is possessed by this college: it contains about 10,000 volumes. The museums of philosophical apparatus, of chemistry, anatomy, and of natural history are amply provided for the purposes of instruction. The portion of the building on the south side of the portico is devoted to instruction in the subjects of the Faculty of Arts and Laws; that on the north, to the subjects of the Faculty of Medicine. In the east court of the north end is a spacious, well-lighted hall, 95 feet long, 28 wide, and 24 high, for the study of practical anatomy, and adjoining is the Birkbeck laboratory, fitted up for the instruction in practical chemistry and in chemical manipulations, distinct from other laboratory pursuits.

THE UNIVERSITY OF LONDON, as stated above, owes its establishment to the formation of what was at first called the London University, and is now University College, London, succeeded as it was by the institution of King's College. [KING'S COLLEGE.] In order to promote the objects of these schools it was found necessary that a body should be formed, with the power and means of examining the students, and the right of conferring degrees. The original charter given by King William IV. was a temporary one. Queen Victoria, in the first year of her reign, revoked it, and granted a new one; additional powers were given in 1850; a wholly new charter in 1858; and the charter now in force, superseding all others, bears date January 6, 1863. The reasons for this succession of charters was that experience gradually suggested changes in the organization. One of the most natural of these was, that when a body of London University graduates had once been formed it was found necessary to admit them to some share in the government of the university, of which they were the offspring. Accordingly the university now consists of a chancellor, vice-chancellor, a senate of thirty-six fellows, and the body of graduates. The chancellor, vice-chancellor, and fellows really rule, and make whatever fresh changes from time to time the charter has left to their discretion; but the graduates in convocation have a deliberative power on all matters concerning the university, and also a certain power in the nomination of new members of the Senate. With all these changes the university still remains essentially what it was in the first instance—not a teaching body, not a body growing out of or representing any group of teaching bodies, like the universities of Oxford and Cambridge, and those of Scotland, but simply an institution for ascertaining, by means of examination, those persons in any part of the British dominions who have acquired proficiency in literature, science, and art, and of rewarding them by academical degrees. The queen is the visitor, and to the crown is reserved the power of from time to time appointing any number of fellows; but in case the number shall be at any time reduced below twenty-five, exclusive of the chancellor and vice-chancellor, the

members of the Senate may elect twelve or more persons to be fellows in order to complete the number of thirty-six fellows, besides the chancellor and vice-chancellor. The chancellor is appointed by the crown. The office of vice-chancellor is an annual one, and is filled by election by the fellows from their own body. The Reform Act of 1867 conferred on the university the privilege of sending a member to represent it in the House of Commons. The executive officer of the Senate is the registrar.

An examination for degrees must be held once a year at least. The candidates are examined in as many branches of general knowledge as the Senate shall consider most fitting, in short in every subject of a liberal or professional education—excluding only theology. The examiners are appointed by the Senate, either from their own body or otherwise. The Senate confers, after examination, the degrees of Bachelor of Arts, Master of Arts, Bachelor of Laws, Doctor of Laws, Bachelor of Science, and Doctor of Science, Bachelor of Medicine, and Doctor of Medicine. Under the provisions of a supplemental charter, granted in November, 1867, they also now award certificates to females who successfully pass examinations in literature, science, and art. It must be evident that in an institution such as the one under notice—which is, in fact, nothing but a first-class examining body, empowered to grant degrees—everything must depend upon the examiners; and the highest functions of the Senate are the election of these gentlemen, and the discussion with them from time to time of the proper methods and subjects of examination. At present there are forty examiners. They are arranged in pairs, so that there are two examiners to each of twenty designated subjects. The examiners are appointed but for a limited term, so that there may always be a re-inforcement among them of fresh men. The present body of the examiners includes men of the highest distinction, some of them graduates of the university itself, others of Oxford, Cambridge, or Dublin, or one or other of the Scottish universities; and that the examinations have ever been of a very superior quality is proved by the value everywhere set on a London degree.

The various examinations for Arts, Laws, and Medicine, are held yearly, but at different times. The examiners receive salaries fixed by the Senate, subject to the approval of the ministers of the crown. The expenses are defrayed, partly by a grant from the government, and partly by the fees paid by students on examination. There are a few scholarships in the gift of the university, and some other rewards for proficiency in the various branches of study. As yet the university has no building of its own, but is quartered in a wing of Burlington House, Piccadilly, where the examinations take place.

A candidate for degrees is entitled to examination on producing a certificate that he has completed the course of instruction required by the university. For degrees in Arts and Laws the following places are entitled to grant certificates:—

The Universities of the United Kingdom.
The University of Sydney.
The University of Toronto.
King's College, London.
University College, London.
The Queen's Colleges in Ireland.
St. Cuthbert's College, Ushaw.
Stonyhurst College.
Manchester New College.
St. Mary's College, Oscott.

St. Patrick's College, Carlow.
St. Edmund's College, near Ware.
Spring Hill College, Moseley, near Birmingham.
The College, Regent's Park (late Stepney College).
College of St. Gregory the Great, Downside, near Bath.
Countess of Huntingdon's College at Cheshunt.
Baptist College at Bristol.
Airedale College, Undercliffe, near Bradford.
Protestant Dissenters' College at Rotherham.
Presbyterian College at Caermarthen.
St. Kyran's College, Kilkenny.
Huddersfield College.
Lancashire Independent College.
Wesley College, near Sheffield.
Queen's College, Birmingham.
Wesleyan Collegiate Institution at Taunton.
Western College, Plymouth.
West of England Dissenters' Proprietary School, Taunton.
St. Patrick's College, Thurles.
New College, London.
Owen's College, Manchester.
Bedford Grammar Schools.
Brecon Independent College.
Rawdon College, near Leeds (late Horton College, Bradford).
Hackney Theological Seminary.
Trevecca College, Breconshire.
Bishop Stortford Collegiate School.
Working Men's College, London.
Queen's College, Liverpool.

The following are the institutions from which the university receives certificates for degrees in Medicine:—

ENGLAND.

Bath.—Bath United Hospital.
Bedford.—General Infirmary and Fever Hospital.
Birmingham.—Queen's College. General Hospital. Sydenham College.
Bristol.—Medical School. Infirmary. St. Peter's Hospital. General Hospital.
Cambridge.—University Medical School and Addenbrooke's Hospital.
Exeter.—Devon and Exeter Hospital.
Haslar.—The Royal Naval Hospital.
Hull.—Hull and E. R. of York School of Medicine, &c.
Leeds.—School of Medicine. General Infirmary.
Leicester.—Leicester Infirmary.
Liverpool.—Royal Infirmary School of Medicine. Royal Infirmary. Fever Hospital. Northern Hospital.
London.—University College.
King's College.
London Hospital.
Middlesex Hospital.
Charing Cross Hospital.
St. Thomas' Hospital.
St. Bartholomew's Hospital.
Westminster Hospital.
Guy's Hospital.
St. George's Hospital.
The Physicians of the St. Marylebone Infirmary.
The Royal College of Chemistry.
St. Mary's Hospital, Paddington.
Brompton Hospital for Consumption, for Three Months' Medical Hospital Practice.
Royal South London Dispensary.
Carey Street Dispensary.

St. Luke's Hospital,
Bethlehem Royal Hospital,
Camberwell House Asylum,
} for Attendance at a Lunatic Asylum.

Manchester.—Royal School of Medicine and Surgery.
The Union Hospital.
The Royal Infirmary.
School of Medicine in Chatham Street.
Owen's College, for Instruction in Chemistry.

Newcastle-upon-Tyne.—College of Medicine in connection with the University of Durham. College of Medicine and Practical Science. The Infirmary.

Northampton.—The General Infirmary.

Norwich.—Norfolk and Norwich Hospital.

Nottingham.—The General Hospital.

Sheffield.—The Sheffield Medical Institution.

SCOTLAND.

Aberdeen.—King's College and University. Royal Infirmary.

Edinburgh.—University of Edinburgh. Medical and Surgical School, Surgeon's Hall. Royal Infirmary.

Glasgow.—University of Glasgow. Andersonian Institution. Royal Infirmary.

IRELAND.

The Queen's Colleges in Ireland.

Belfast.—Belfast General Hospital.

Cork.—Cork North Infirmary and South Infirmary, in conjunction.

Dublin.—School of Physic in Ireland.
School of Medicine of the Catholic University.
Carmichael School of Anatomy, &c.
St. Vincent's Hospital.
Mercer's Hospital.
Jervis Street Hospital.
Royal College of Surgeons in Ireland.
Meath Hospital.
City of Dublin Hospital.
Coombe Lying-in Hospital.
Dr. Steevens' Hospital.
Adelaide Hospital.
Mater Misericordiæ Hospital.
Sir Patrick Dun's Hospital.

Maryborough.—Queen's County Infirmary.

Malta.—The University of Malta.

Ceylon.—The Military Hospital in the Island of Ceylon.

Bengal.—The Medical College of Bengal.

Canada.—The University of McGill College, Montreal.
The St. Lawrence School of Medicine, Montreal.

Bombay.—Grant Medical College.

The above list of institutions is taken from the University Calendar for 1868, but to a great extent the necessity of requiring a certificate from one of them, previous to examination, is, in reality, now dispensed with. It is true the charter of 1863 still binds the authorities to require from candidates for the degrees of Medicine and Surgery certificates of a certain amount of instruction at a medical school—it being felt that it would be injudicious to qualify surgeons and doctors of medicine merely by examinations calculated to ascertain proficiency, without caring where or how that proficiency had been attained. But for the degrees in Arts, Laws, and Science, no such qualification is needed. The charter, certainly, ordains that the authorities shall admit as candidates persons who shall produce satisfactory evidence that they have completed in any of the 'said institutions (*i.e.*, the institutions in the adopted list) the course of instruction which the said chancellor, vice-chancellor, and fellows shall from time to time by regulations in that behalf determine.' Then, however, the charter goes on to ordain also that persons *not* educated in any of the said institutions shall be admitted as candidates for matriculation and degrees. Putting the two clauses together, therefore, it is evident that all persons, whether educated or not at any of the specified schools and colleges, may become candidates for any degrees, other than medical and surgical; and that it is left very much to the Senate to determine what difference, if any, should be made in favour of those who had been educated at any of the adopted institutions. As a matter of fact the Senate have now practically swept away all distinction, with these exceptions—(1) That persons who are already graduates in Arts in any of the universities of the United Kingdom may skip the matriculation examination, and become candidates at once for the B.A. degree, or the B.Sc. (Bachelor of Science) degree, or the LL.B. degree in the University of London; (2) That persons who have already graduated B.A. in any one of the four universities of Oxford, Cambridge, Dublin, or Durham, may, after an interval of a year from such graduation, become candidates for the M.A. degree in the University of London. With these exceptions so far as Arts, Laws, Science, and Literature are concerned, the University of London really places the whole outside world on an equal footing, and it is all the same to it whether the man who presents himself for examination has been attending any of the colleges or schools in special connection with it, or has been acquiring knowledge by private industry. Its sole test of worthiness is its own examination. To make the university still further useful to persons living in the provinces, in 1867 examinations for matriculation and for the degrees of B.A. and B.Sc. were held at Manchester, Liverpool, and Carlow, conducted by sub-examiners simultaneously with the examinations in London, and applications for such local examinations are invited by the Senate from other towns and cities. The papers of questions at these provincial examinations are, of course, the same as those used in London, and the answers are sent to London to be examined.

The principal regulations connected with the examinations of the London University are the following:—

Matriculation.—There shall be two examinations for matriculation in each year; one commencing on the second Monday in January, and the other on the last Monday in June.*

No candidate shall be admitted to the examination unless he has produced a certificate showing that he has completed his sixteenth year.

A fee of 2*l.* shall be paid at matriculation. If a candidate withdraw or fail to pass the examination, the fee shall not be returned to him; but he shall be

* Candidates for the degree of B.A., and candidates for the degree of B.Sc., of LL.B., or of M.B., who have not graduated in arts in one of the universities of the United Kingdom, are required to have passed the matriculation examination.

This examination is accepted (1) by the Council of Military Education in lieu of the entrance examination otherwise imposed on candidates for admission to the Royal Military College at Sandhurst; and (2) by the College of Surgeons in lieu of the preliminary examination otherwise imposed on candidates for its fellowship. It is also among those examinations of which some one must be passed (1) by every medical student on commencing his professional studies; and (2) by every person entering upon articles of clerkship to an attorney—any such person matriculating in the first division being entitled to exemption from one year's service.

admissible to any *two* subsequent matriculation examinations without the payment of any additional fee.

Candidates shall be examined in the following subjects:—

Mathematics.—Arithmetic—the ordinary rules; vulgar and decimal fractions; extraction of the square root. Algebra—addition, subtraction, multiplication, and division of algebraical quantities; proportion; arithmetical and geometrical progression; simple equations. Geometry—the first four books of Euclid:—or, the principal properties of triangles, and of squares and other parallelograms, treated geometrically: the principal properties of the circle, and of its inscribed and circumscribed figures, treated geometrically.

*Natural Philosophy.**—Mechanics—explain the composition and resolution of statical forces; describe the simple machines (*mechanical powers*), and state the ratio of the power to the weight in each; define the centre of gravity; give the general laws of motion, and describe the chief experiments by which they may be illustrated; state the law of the motion of falling bodies. Hydrostatics, Hydraulics, and Pneumatics—explain the pressure of liquids and gases, its equal diffusion, and variation with the depth; define specific gravity, and show how the specific gravity of bodies may be ascertained; describe and explain the barometer, the siphon, the common pump and forcing pump, and the air-pump. Acoustics—describe the nature of sound. Optics—state the laws of reflection and refraction; explain the formation of images by simple lenses.

Chemistry.—Heat—its sources. Expansion. Thermometers—relations between different scales in common use. Difference between temperature and quantity of heat. Specific and latent heat. Calorimeters. Liquefaction. Ebullition. Evaporation. Conduction. Convection. Radiation.

Chemistry of the non-metallic elements; including their compounds as enumerated below—their chief physical and chemical characters—their preparation—and their characteristic tests.

Oxygen, hydrogen, carbon, nitrogen. Chlorine, bromine, iodine, fluorine. Sulphur, phosphorus, silicon.

Combining proportions by weight and by volume. General nature of acids, bases, and salts. Symbols and nomenclature.

The atmosphere—its constitution; effects of animal and vegetable life upon its composition.

Combustion. Structure and properties of flame. Nature and composition of ordinary fuel.

Water. Chemical peculiarities of natural waters, such as rain-water, river-water, spring-water, sea-water.

Carbonic acid. Oxides and acids of nitrogen. Ammonia. Olefiant gas, marsh gas, sulphurous and sulphuric acids, sulphuretted hydrogen.

Hydrochloric acid. Phosphoric acid and phosphuretted hydrogen. Silica.

Classics.—The Greek and Latin Languages—one Greek and one Latin subject, from the works of the undermentioned authors:—Homer, Xenophon, Terence, Virgil, Horace, Sallust, Cæsar, Livy, Cicero, Ovid.

The paper in Greek shall contain passages to be translated into English, with questions in grammar, history, and geography. The paper in Latin shall contain passages to be translated into English, with questions in history and geography. A separate paper shall be set containing questions in Latin grammar, with simple and easy sentences of English to be translated into Latin. [Special stress is laid on accuracy in the answers to the questions in Greek and Latin grammar.]

The English Language—Orthography; writing from dictation; the grammatical structure of the language.

Outlines of English History and Modern Geography—history of England to the end of the seventeenth century, with questions in modern geography.

The French or the German Language, at the option of the candidate.

The papers in French and German shall contain passages for translation into English from works previously selected and made known by the Senate, and questions in grammar (limited to the accidence) on subjects furnished by those passages; together with short and easy passages for translation into English from prose works not previously announced.

Candidates shall not be approved by the examiners unless they show a competent knowledge in each of the following subjects:—

1. Classics, including the Greek and Latin languages, with grammar, history, and geography; 2. The English language, English history, and modern geography; 3. Mathematics; 4. Natural philosophy; 5. Chemistry; 6. Either the French or the German language.

Any candidate who may obtain a place in the honours division at the matriculation examination in January shall be admissible to the first B.A. or to the first B.Sc. examination in the following July. But such candidate shall not be admissible to the second B.A. or to the second B.Sc. examination in the ensuing year, unless he shall have attained the age of eighteen years.

Bachelor of Arts.—Candidates for the degree of Bachelor of Arts shall be required to have passed the matriculation examination, and to pass two subsequent examinations.

The first B.A. examination shall take place once in each year, and shall commence on the third Monday in July. No candidate (with the exception of such as have obtained honours at the matriculation examination in the preceding January) shall be admitted to this examination within one academical year of the time of his passing the matriculation examination: nor shall any candidate be admitted unless he have produced a satisfactory certificate of good conduct. The fee for this examination shall be 5*l*. If a candidate withdraw or fail to pass the examination, the fee shall not be returned to him; but he shall be admissible to any *two* subsequent first B.A. examinations without the payment of any additional fee.

Candidates shall be examined in the following subjects:—

Mathematics.—Arithmetic—The ordinary rules of arithmetic; vulgar and decimal fractions; extraction of the square root. Algebra—addition, subtraction, multiplication, and division of algebraical quantities; algebraical proportion and variation; permutations and combinations; arithmetical and geometrical progression; simple and compound interest; discount and annuities for terms of years; simple and quadratic equations, and questions producing them; the nature and use of logarithms. Geometry—the relations of similar figures; the eleventh book of Euclid to Prop. 21; the equation to the straight line and the equation to the circle referred to rectangular co-ordinates; the equations to the conic sections referred to rectangular co-ordinates. Plane Trigonometry—plane trigonometry as far as to enable the candidate to solve all the cases of plane triangles; the expression for the area of a triangle in terms of its sides.

Latin, and Roman History.—The Latin Language—two Latin subjects, one in prose, the other in verse, from the works of the undermentioned authors:—Terence, Virgil, Horace, Cicero, Livy, Tacitus.

The papers in Latin shall contain passages of the ancient authors to be translated into English, and short passages of English to be translated into Latin. The papers shall also contain questions in grammar, history, and geography.

History—history of Rome to the death of Augustus.

The English Language, Literature, and History.—Writing out the substance of a paragraph previously read by the examiner; the grammatical structure of the language; composition; other special subjects to be defined from time to time; history of England to the end of the seventeenth century.

The French or the German Language.—Translation into English; translation from English into French or German.

Candidates shall not be approved by the examiners unless they show a competent knowledge in

1. Latin, and Roman history; 2. English language, literature, and history; 3. Mathematics; 4. Either the French or the German language.

Examination for Honours.—Any candidate who has passed the first B.A. examination in all its subjects may be examined for honours (1) in mathematics and mechanical philosophy, (2) in Latin, and (3) in English;

* The knowledge required of these subjects in natural philosophy is such as may be attained by attending a course of experimental lectures.

and for prizes in the French and German languages and literature.

The second B.A. examination shall take place once a year, and shall commence on the fourth Monday in October.

No candidate shall be admitted to this examination within one academical year of the time of his passing the first B.A. examination, unless he have previously taken the degree of B.Sc.: nor shall any candidate be admitted unless he have produced a satisfactory certificate of good conduct.

The fee for this examination shall be 5*l.*, and the conditions shall be the same as for the first examination.

Candidates shall be examined in the following subjects:

Mechanical and Natural Philosophy.—Statics—elementary statics, including the resolution of forces, the mechanical powers, the centre of gravity, and simple cases of equilibrium of bodies or systems of bodies under the action of gravity. Dynamics—elementary dynamics, including the laws of motion, and propositions required for determining the rectilinear motion of a body whether free or along inclined planes; motion of projectiles, and the simpler cases of motion round centres of force. Hydrostatics, Hydraulics, and Pneumatics—elementary propositions respecting the nature, transmission, and intensity of fluid pressure; and the conditions of equilibrium of floating bodies; nature and simple properties of elastic fluids, and the pressures produced by them; specific gravity, and modes of determining it; the common pump and forcing-pump; the hydrostatic press; the barometer; the air-pump; the steam-engine. Optics (Geometrical)—laws of reflection and refraction; reflection at plane mirrors; reflection at spherical mirrors, and refraction through lenses, the incident pencils being direct; separation of solar light into rays of different colours; description of the solar spectrum; description of the eye; simple optical instruments; camera obscura; reflecting and refracting telescopes. Acoustics—nature of sounds; mode of propagation; musical tones, and simple propositions respecting them. Optics (Physical)—fundamental hypotheses of the undulatory theory respecting the origin and propagation of light; general explanation of interferences; formation of Newton's rings, with descriptions of simple experiments which elucidate the effects of interference; polarized light, with the description of simple experimental modes of producing it. Astronomy—systems of great circles to which the positions of the heavenly bodies are referred; principal phenomena depending on the motion of the earth round the sun, and its rotatory motion round its own axis; general description of the solar system; general explanation of lunar and solar eclipses.

Animal Physiology.—The mechanical, chemical, and vital properties of the several elementary tissues of animals; nature and composition of the principal substances used as food by animals; comparative structure and actions of the organs of digestion, absorption, and assimilation; composition and properties of the chyle, lymph, and blood; comparative structure, arrangement, and actions of the circulatory and respiratory organs in the animal series; chemical effects of respiration; essential structure of secretory organs; principal varieties presented in the structure of the liver and the kidney; objects of the several excretory processes; development of heat, light, and electricity by animals; comparative structure and actions of the nervous system; comparative structure and actions of the organs of sense; animal mechanics; general history of development and metamorphosis in the principal types of animals.

Classics.—The Greek and Latin Languages—one Greek subject and one Latin prose subject, to be selected by the Senate from the works of the undermentioned authors:—Homer, Æschylus, Sophocles, Euripides, Herodotus, Thucydides, Plato, Xenophon, Demosthenes, Cicero, Livy, Tacitus.

The papers in classics shall contain passages of the ancient authors to be translated into English, and short passages of English to be translated into Latin. The papers shall also contain questions in grammar, history, and geography.

History—history of Greece to the death of Alexander.

Logic and Moral Philosophy.—Names, notions, and propositions; syllogism; induction and subsidiary operations; the senses; the intellect; the will, including the theory of moral obligation.

Candidates shall not be approved by the examiners unless they show a competent knowledge in—

1. Classics; 2. Grecian history; 3. Mechanical and natural philosophy; 4. Animal physiology; 5. Logic and moral philosophy.

A certificate under the seal of the university, and signed by the chancellor, shall be delivered at the public presentation for degrees to each candidate who has passed.

Examination for Honours.—Any candidate who has passed the second B.A. examination, and has not previously passed the second B.Sc. examination, may be examined for honours in (1) mathematics and natural philosophy, (2) classics, (3) logic and moral philosophy, and (4) animal physiology.

Master of Arts.—The examination for the degree of Master of Arts shall take place once in each year, and shall commence on the first Monday in June.

No candidate shall be admitted to the examination for the degree of M.A. until after the expiration of one academical year from the time of his obtaining the degree of B.A. in this university or in one of the universities of Oxford, Cambridge, Dublin, and Durham, nor unless he have shown evidence of having completed his twentieth year.

The fee for the degree of M.A. shall be 10*l.* If a candidate withdraw or fail to pass the examination, the fee shall not be returned to him, but he shall be admissible to any *one* subsequent M.A. examination without the payment of any additional fee.

Candidates shall be examined in one or more of the following branches of knowledge:—

I. Classics; II. Mathematics and natural philosophy; III. Logic and moral philosophy, political philosophy, history of philosophy, political economy.

No candidate shall be approved by the examiners unless he show a competent knowledge in one of these branches of knowledge.

The examination in Classics shall include the following subjects:—

The Greek and Latin classic authors; prose composition in Greek, Latin, and English; ancient history, and the history of Europe to the end of the eighteenth century.

The examination in Mathematics and Natural Philosophy shall include the following subjects:—

Algebra, including the theory of equations; analytical geometry; the differential and integral calculus; theory of probability; statics and dynamics; hydrostatics; hydraulics and pneumatics; optics; plane astronomy; physical astronomy.

The examination in Branch III. shall include the following subjects:—

Logic and Moral Philosophy—names, notions, and propositions; syllogism, induction and subsidiary operations; the senses; the intellect; the emotions; the will; the ethical systems. Political Philosophy—the theories of politics, ancient and modern. History of Philosophy. Political Economy.

Doctor of Literature.—Candidates for the degree of Doctor of Literature shall be required to have obtained the degree of B.A. in this university, or in one of the universities of Oxford, Cambridge, Dublin, and Durham, and to pass two subsequent examinations. Nevertheless, Masters of Arts in this university who have taken their degree in Branch I. shall be admitted to the degree of Doctor of Literature after passing the second of the two examinations only.

First D.Lit. Examination.—Candidates shall be examined in—

1. The Greek and Latin classic authors; 2. Prose composition in Greek, Latin, and English; 3. Ancient history, and the history of Europe to the end of the eighteenth century.

Second D.Lit. Examination.—No candidate shall be admitted to this examination within one academical year of the time of his passing either the first D.Lit. examination or the M.A. examination in Branch I.

Candidates shall be examined in—

1. English language, literature, and history: and in any two of the following subjects, at the selection of the candidate, provided that either French or German be one of them:—2. French language and literature; 3. German language and literature; 4. Anglo-Saxon language and literature, with Icelandic language and literature; 5. Sanskrit language and literature; 6. Arabic language and literature; 7. Hebrew language and literature, with Syriac language and literature.

The examinations for the degrees of B.Sc., D.Sc. (Doctor of Science), LL.B., LL.D., M.B., B.S. (Bachelor of Surgery), M.S., and M.D., being of much less public interest than the preceding, we do not think it necessary to give their subjects. They may all be found in detail in the annual calendars of the university, and to them we must refer for further information.

UNIVERSITY COLLEGE, OXFORD. This college is believed to have been founded, in the year 872, by Alfred the Great. It was restored by William of Durham, said to have been archdeacon of Durham; but respecting whom little authentic information has been preserved, except that he was rector of Wearmouth in that county, and that he died in 1249, bequeathing a sum of money to provide a permanent endowment for the maintenance of a certain number of masters. The first purchase with this bequest was made in 1253, and the first statutes are dated 1280. The chief benefactors since that period have been King Henry IV.; Walter Skirlaw, bishop of Durham; Henry Percy, earl of Northumberland; Robert Dudley, earl of Leicester; John Freestone, Esq.; Sir Simon Bennet, Bart.; Rev. Charles Greenwood; Dr. John Radcliffe; and Dr. John Browne.

The present foundation consists of a master, twelve fellows, with one by-fellow, and ten scholars, with certain exhibitors, and two bible-clerks.

In the election to the fellowships no preference is now given to any person in respect of place of birth, or of his being, or having been, a scholar on any foundation in the college.

In 1837 a Civil Law Fellowship was founded in this college by Mary Anne, Viscountess Sidmouth, in honour of her father, the late Lord Stowell, at one time a fellow of this society. This fellowship is open to all members of the University of Oxford who have passed the examination for the degree of Bachelor of Arts; and is tenable for seven years.

The scholarships are open without regard to place of birth or education, and are tenable for five years from the date of election. The emolument is 60*l.* per annum, including allowance for room rent during residence.

Of the exhibitions, three of the value of 50*l.* a year, during residence, were founded in 1595 by John Freestone, Esq., for persons educated in the grammar-schools of Wakefield, Pontefract, and Normanton in the county of York. In failure of candidates properly qualified from these schools, the exhibitions for that turn are open to general competition. Four, of 40*l.* a year during residence, founded in 1618 by the Rev. Robert Gunsley, are limited to persons educated in the grammar-schools of Rochester and Maidstone, two to be elected from each. There are also other small exhibitions.

Of the present buildings of the college, forming two courts, the hall was begun in 1640, but was not completed till the reign of Charles II. The chapel was completed in 1665. The library, on the south side, beyond the principal quadrangle, was finished in 1669. The grand front of this college, with two gateways, each with a tower above, extends upwards of 260 feet, and is one of the principal ornaments of the High Street. Statues of Queen Mary and Queen Anne stand above the gateways of the courts toward the street, and others of King James II. and Dr. Radcliffe above the gateways within. Some additional buildings toward the High Street have been since erected.

The queen is the visitor of this college. (*Oxford University Calendar*, 1868).

UNIVERSITY OF FRANCE. Since the Revolution the term *Université* in France has lost its original meaning, and it is now synonymous with the national system of education in France. Every commune is obliged by law to support at least one primary school, either of its own, or in conjunction with neighbouring communes. Reading, writing, grammar, arithmetic, geography, history, and drawing—all taught gratuitously—are the principal branches of education in these schools, the total number of which is about 90,000; in addition to numerous scholastic institutions of a higher class, also under the control of the council of public instruction. There are twenty-seven academies for superior instruction, one in each of the cities and towns in which there is an imperial court of justice, excepting Ajaccio. Each of these academies is governed by a rector and two inspectors, who visit in turn all the schools, both private and public, within their separate jurisdictions. The faculties of these academies are empowered to grant the degrees of doctors, licentiate, and bachelor. There is in Paris an *école normale*, or academy for the education of professors for the colleges throughout the country. The whole of the foregoing establishments constitute the *University of France*, which is presided over by the minister of public instruction and a council of nine members, under whose authority twelve inspectors-general visit all parts of the empire, to ascertain the state of education. The College of France, the 'Institut National,' and some other literary and scientific institutions, are beyond the jurisdiction of the university.

UNKIAR-SKELESSI ('landing place of the emperor'), a village of Asia Minor, on the Bosporus, 8 miles N.N.E. of Constantinople, which gives its name to a treaty concluded here between Russia and Turkey in 1833. The treaty was one of mutual defensive alliance; but by a separate and secret article the sultan agreed to close the Strait of the Dardanelles against all foreign vessels of war. The stipulations of the treaty of Unkiar Skelessi were annulled by the terms of that concluded at London, July 13, 1841.

UNLIMITED. This term is frequently used by mathematical writers, in the same manner as *Indefinite*, to avoid the entrance of the word *Infinite*. It is also used to describe a problem which may have an infinite number of answers, and which is called an Unlimited Problem.

UNO'NA, a genus of the natural family of *Anonaceæ*, whose species consist of trees, large shrubs, or climbing plants, found in hot parts of the world, as India and its islands, Africa, and South America. The bark and fruit of many of the species are aromatic, with some degree of acridity, and are employed as stimulating medicines or as condiments. *U. Æthiopica*, a native of Ethiopia and Sierra Leone, has obtained more celebrity than other varieties, from being supposed to yield the seeds formerly well known under the name of Ethiopic Pepper.

UNST, the northernmost of the SHETLAND ISLANDS of Scotland, in 60° 53′ N. lat. and 1° 0′ W. long., is 11

miles in length, with an average breadth of between 3 and 4 miles, and covers an area of about 36 square miles. It is separated from Yell, on the S.W., by a strait about a mile across. The population of the island in 1861 was 3042—1272 males and 1770 females. The shores are much indented with bays and creeks, and around the coast are numerous natural caves. The surface is level, and includes 2000 acres of arable, and an equal quantity of pasture land. The latter is mostly covered with a short tender heath, affording excellent feeding for sheep. The soil is, on the whole, tolerably fertile; and a valley containing freshwater lakes extends throughout the whole length of the island. The minerals comprise gneiss, serpentine, schists, talc, limestone, asbestos, and chromate of iron. The inhabitants are chiefly employed in fishing and agriculture, but some manufactures of Shetland wool are carried on. The principal harbours are Uyea Sound on the S., and Balta Sound on the E.

UNTERWALDEN, a canton of Switzerland, bounded north by the Waldstätter See, or Lake of Lucerne, west by Lucerne, south by the Bernese Oberland, and east by Uri. The area is about 290 square miles, and the population in 1860 was 24,902. The canton is bordered and intersected in all directions by mountain groups or isolated masses, few of which, however, rise above the snow-line. Their general slope is towards the north, as they attain their greatest height in the south, and thence descend gradually towards the Lake of Lucerne. These hills form two parallel valleys, each about 15 miles in length. The eastern valley is drained by the Engelberg Aa, a torrent which flows by the abbey of Engelberg, and enters the lake below Stanz. The western valley is drained by the Sarner Aa (the outlet of the little Alpine lake of Lungern), which, after passing through the Lake of Sarnen, enters that of Lucerne below Alpnach. The lower part of the eastern valley constitutes the district called Nidwald, or 'below the forest;' and the western valley, with the upper part of the eastern one, forms the district called Obwald, or 'above the forest.' These designations relate to the Kernwald, or forest of Kerns, which lies on the border of the two districts. The Obwald and Nidwald have formed two separate communities since 1150. They both joined Schwyz and Uri in the insurrection of 1308; and when the first federal union was entered into at Brunnen, in December, 1315, they were recognized as forming together one canton, by the name of Unterwalden. They retained their separate existence as independent communities, but figured as only one canton, having one vote in all federal affairs, and this arrangement has continued in force to the present time. Both divisions have their local parliament, composed of all the inhabitants of twenty years of age, who meet in the open air late in spring, and pass new laws, pay accounts, impose taxes, and appoint officers. The united canton occupies the sixth place in the Swiss Confederation. [SWITZERLAND.]

The surface of Unterwalden is very diversified, and in some places forms scenery of remarkable beauty and sublimity. It is chiefly a pastoral canton, and the pastures are mostly natural. About 20,000 cwts. of cheese are made annually. The country abounds with fruit trees, and a little wine is made. The honey is excellent. The soil is generally fertile, producing far up on the mountain sides extensive forests of excellent timber, and lower down, plantations of chestnuts, and great quantities of apples and pears. The whole district belongs to the chalk formation, in which a great number of remarkable caverns occur.

The canton imports corn, wine, salt, manufactures, and colonial articles; and exports cattle, cheese, butter, timber, and hides. It is not favourably situated for trade, being confined between the Alps and the lake, with no high road passing through it, and none but mountain passes leading out of it. Each of its two divisions has a hospital and a poorhouse. A dialect of the Swiss-German is the language universally spoken. The Roman Catholic is the religion of the whole canton. The Benedictine monastery of Engelberg, which is more than 3000 feet above the sea, is a foundation of the eleventh century. It has a library of 20,000 volumes, and several valuable MSS., a collection of medals, engravings, armorial ensigns, and a grammar-school.

The principal towns or villages, all of which have about 2000 or 3000 inhabitants, are—*Sarnen*, the chief place of the Obwald, on the northern extremity of the Lake of Sarnen, 11 miles south of Lucerne. It has a fine town-house, with several historical portraits, a college, and an hospital. The arsenal of Obwald is on the hill called Landenberg, where was once the castle, the residence of the Austrian governors. *Kerns*, on the road from Sarnen to Stanz, is a pretty village, with a handsome church. *Stanz*, the chief town of the Nidwald, which is situated 7 miles S.S.E. of Lucerne, in a fine plain at the foot of mountains, has a splendid parish church with a noble dome, and a fine square before it, with two fountains, and a statue of Winkelried, the hero of Sempach, who was a native of Stanz, and is represented with a bundle of spears in his arms. A tablet in the church, and a monument near the town, commemorate the unfortunate people whom the French massacred for defending their homes in 1798, while the survivors became exiles.

UNWRITTEN LAWS are such as have been delivered down by tradition or in songs. Such were the laws of the early nations of Europe. The unwritten laws of England, called common law, are such as have not the authority of statutes, not having originated from any legislative act. These laws are now contained in the reports of judicial decisions.

UPAS TREE. [ANTIARIS.]

UPOLU, one of the Samoan Islands, in the Pacific Ocean, lat. 14° 2′ S., long. 171° 21′ W., is visited annually by English and American whalers, for the plentiful supply of fruits and vegetables to be obtained there. Cotton and coffee are grown, but cocoa-nut oil is the chief export. The area is about 60 square miles, and the population is estimated at 25,000. It is a British missionary station, and many of the inhabitants are Christians.

UPPINGHAM. [RUTLAND.]

UPSA'LA is a town in Sweden, situated on the Fyrisä, a navigable stream in the Upsala Län, in 59° 51′ N. lat., 17° 30′ E. long., 45 miles N.N.W. of Stockholm. The population was 9252 in 1865. The town extends over a great area, as there are large gardens to most of the houses. The latter are partly of stone and partly of wood, and generally only two stories high. The streets are wide and straight, especially those that terminate in the spacious square which occupies the centre of the town. Upsala is the seat of an archbishop, who is the primate of the whole of Sweden. The cathedral, which was erected between 1258 and 1435, and in which the Swedish kings were formerly crowned, is considered the finest Gothic building in Sweden. It contains monuments to many distinguished persons, among others to Gustavus I. and Linnæus. The building has, however, been somewhat disfigured

by recent restorations. The square in which the church stands is surrounded by the university buildings, which contain a library of 135,000 volumes and 7000 MSS. (the richest in Sweden), including the 'Codex Argenteus,' a copy of the Gospels in Gothic, as translated by Bishop Ulfilus at the end of the fourth century; a collection of coins; an anatomical theatre, observatory, chemical laboratory, and a very extensive collection of natural objects. There is also an ecclesiastical school, governor's palace, and old and new botanical gardens. The university, which was established in 1478, has twenty-four regular and fourteen adjunct professors. It is the chief institution of the kind in Sweden, and is generally attended by about 900 students. Like those in Scotland and Germany, they lodge in the town, and their expenditure for a session may be estimated at about 30*l*. All the public lectures are free, and very few private ones are attended. The best paid professors only receive 300*l*. a year, and many have less. About 150 students are maintained, free of expense, from endowments left by Gustavus Adolphus. The Society of Sciences, instituted in 1719, has published several volumes of Transactions. Nearly all the inhabitants are more or less dependent on the university. There is steam communication with Stockholm on the river. The town, which was the old capital of Sweden, stands in the midst of a very extensive and fertile plain, and about 6 miles to the south-east are the *mora-stones*, at which the electors met for the purpose of choosing their king when it was an elective kingdom (1140–1520).

Upsala, Gamla, or *Old Upsala*, a town about 3 miles north of the present Upsala, is, next to Sigtuna, the most ancient residence of the Swedish kings, but is now reduced to a small village. The church has been built out of the ruins of old heathen temples, and its tower is understood to have formed part of the temple of Odin. Numerous antiquities have been found near here, and among the tumuli in the vicinity are the graves of Odin, Freya, and Thor.

UPTON. [WORCESTERSHIRE.]

UPUPIDÆ, a family of *Insessores*, or *Perching Birds*, of which the Hoopoe (*Upupa epops*) is the only European example. Africa and India respectively present us with two more. The prince of Musignano, in his 'Conspectus,' places the *Upupidæ* between the *Promeropidæ* and the *Bucerotidæ* in his third order *Passeres*.

Dr. Gray makes the *Upupidæ* (*Upupa*, Linn.), the first family of the *Tenuirostres*, consist of the following sub-families and genera:—

Sub-family 1. *Upupinæ*.

Genera: *Upupa*, Linn.; *Fregilupus*, Less.; *Falculia*, J. Geoffr.; *Neomorpha*, Gould; *Seleucides*, Less.; *Craspedophora*, G. R. Gray; *Ptiloris*, Swainson.

Sub-family 2. *Promeropinæ*.

Genera: *Promerops*, Briss.; *Rhinopomastus*, Smith; *Epimachus*, Cuv.

The *Upupidæ*, in Dr. Gray's arrangement, are immediately succeeded by the *Nectarinidæ*.

Our limits will not permit us to notice particularly in this article more than the genera *Upupa*, *Promerops*, and *Epimachus*.

The European Hoopoe (*Upupa epops*) is a rare bird in our island; for though it has been known to breed in some counties, yet it is generally in autumn that stragglers on their southern migration make their appearance. This bird is the ἔποψ (Epops) of the Greeks, *Upupa* and *Epops* of the Romans, *Buba*, *Upega*, *Bubola*, *Pupita*, and *Upupa* of the Italians; *Putput*, *Huput*, and *Lupoge* of the French of the Germans, and *Hoopoe* of the British. 'Tenuirostres.')

Geographical Distribution.—As far n summer as Denmark, Sweden, and Russia ward in continental Europe, in Germa France, Spain, and Italy. It has been Gibraltar, Ceuta, and in Egypt (where it b probably an inhabitant of the whole of N It has been also observed at Madeira and from which last locality it has been sent to

Habits, Nidification, &c.—On the Bord the Garonne, and near the city, are lar marshy ground, intersected by broad ditche terminating in the river, where poplars and planted for the sake of their twigs, used vines. These trees being topped become and as they decay at the centre in a fe attacked by numerous insects, particularly *fuliginosa*. Here the Hoopoes are freque amining the rotten wood, and feeding on which abound therein. The Hoopoe flies dom, unless disturbed, its food being so ab require but little search. It breeds in a h about the end of May, the young coming o

Notwithstanding the accounts of th materials which they were said to use, noticed they form their nests of a few dried gras feathers, laying eggs ranging from four number, of a pale lavender gray, about 1 and 8 lines broad.

We agree with the prince of Musigna *Promeropidæ* constitute a family quite that of the *Hoopoes*; nor know we exactl is laid by Dr. Gray in the characters of a his system. For ourselves we object ent families; the term in itself involves a However, as examples of Dr. Gray's *Pro* may notice the *Promerops erythrorhynch* bird having a coral-red bill, long and slende varying with metallic blue and green, and tail composed of graduated feathers. Thi lives in small troops in South Africa. Sen us with another variety or species.

Far more gorgeous even than the Red merops is the *Epimachus magnus*, the *U* of Latham, and the *Grand Promerops* The plumage of this bird is iridescent wit azure, emerald green, violet, and velvet blac saw the bird in its native forests of New writes as follows:—'There does not perhap extraordinary bird, or one more aberrant f after which nature has wrought in this gen Grand Promerops of New Guinea. It is 4 f from the extremity of the bill to that of t body is delicate, slender, and, although it i gated form, appears short and excessively s parison with the tail. To add to the singu bird, nature has placed above and below its ers of an extraordinary form, and such as see in other birds: she seems, moreover, to herself in painting this being, already so s her most brilliant colours. The head, the belly are glittering green; the feathers whic parts have the lustre and softness of velv and to the touch; the back is changeable wings are of the same colour, and appear,

the lights in which they are held, blue, violet, or deep black, always, however, imitating velvet. The tail is composed of twelve feathers; the two middle are the longest, and the lateral ones gradually diminish: it is violet or changeable blue above, and blackish beneath. The feathers which compose it are as wide in proportion as they are long, and shine both above and below with the brilliancy of polished metal. Above the wings, the scapulars are very long and singularly formed; their barbs are very short on one side and very long on the other. These feathers are of the colour of polished steel, changing into blue, terminating by a large spot of brilliant green, and forming a species of tuft or appendage at the origin of the wings. Below the wings spring long curved feathers directed upwards. These are black on the inside, and brilliant green on the outside. The bill and the feet are black.

URAL, a river which forms part of the eastern boundary of Europe, rises in the Ural mountains, near 55° N. lat., at an elevation of 2132 feet above the sea. It first runs south above 200 miles to the fortress of Orskaja, where it turns to the west, in which direction it passes south of the town of Orenburg, and continues to flow about 350 miles to the fortress of Uralsk. Near this place it again turns south, and reaches the Caspian Sea after a total course of about 1000 miles. At Orskaja, where its level is about 550 feet above the sea, the Ural begins to be navigable for large barges. It overflows its banks annually. About 40 miles from its mouth it divides into two channels, of which the eastern preserves the name of Ural, and the western is called Mokroi Backsai. Lower down it again divides into two channels, of which the western is called Ural, and the eastern Bukharka. The last-mentioned is the most convenient for vessels, and on its banks stands the fortified town of Guriew. In the upper part of its course the Ural flows through a channel lined with steep and lofty rocks, its lower portion through extensive steppes and saline marshes. The islands forming its delta are covered with salt-swamps, and entirely unfit for cultivation or pasture. The quantity of fish annually taken in the river is very great. They ascend to the fortress of Uralsk, where their course is stopped by a weir. Belugas (*Accipenser huso*) have been taken here weighing 1000 lbs., and yielding 200 lbs. of caviare; and common sturgeons weighing 200 lbs., and yielding 40 lbs. of caviare. In summer the fish are salted, but in winter they are exported in a frozen state. The value of the fish annually caught is about 100,000*l*.

URAL MOUNTAINS, a high range on the eastern boundary of Europe, separating European Russia from Siberia. Its southern extremity is on the right bank of the river Ural, near 51° N. lat.; the northern terminates in the Arctic Ocean, opposite the island of Nova Zembla, in about 70° N. lat., 60° E. long. The length of the range is about 1250 miles; near 53° N. lat. its width is about 100 miles, but farther north it narrows to less than 50 miles, and between 56° and 60° N. lat. the width is hardly 20 miles. Farther north it grows wider, but this portion is but little known. The general elevation of the range is not great, none of the summits rising to more than 6800 feet above the sea, and the highest parts often falling short of 2000 feet. The eastern slope descends rapidly and with steep declivities to the great plains of Asia. On the west the mountains do not immediately border on the great plains of Eastern Europe, but are separated from them by a hilly tract from 20 to 40 miles wide.

The northern portion of the Ural range is bare and naked: the base is granite, the upper stratifications are limestone and quartz, and many erratic blocks are scattered over the surface. The central and southern sections are clothed with timber, chiefly pines, cedars, larches, and other natives of a northern climate; oak and ash are found in the south-western parts. There are many rich valleys and fine pastures, where great numbers of cattle are bred. Numerous rivers abounding in fish issue from both sides of the chain, the principal of which are the Sosva, the Isset, the Tobol, the Emba, the Ural, the Belaia, the Kama, and the Petchora. There are seven passes over these mountains; the five that are the most easy to cross are the road from Perm to Ekatarinburg; that to Petropauloskaja; and the roads to Orenburg.

The central part of the Ural mountains is one of the richest mineral regions in the world. The most important products are iron, copper, gold, silver, platinum, and salt. A variety of other mineral productions are also found, among which are topaz, iridium, malachite, the onyx, topaz-emerald, beryl, and agate. Diamonds have been found of small size, but of very pure water. The population of the Ural mountains is 135,000, nearly all of whom are dependent on the mines.

URAMILE is a complex substance, formed of $C_8\,H_5\,N_3\,O_6$. Its plumose acicular crystals are permanent in the air, and become of a pink colour when heated; they are insoluble in cold, and but slightly soluble in boiling water. The alkalies ammonia, potash, and soda, dissolve uramile, and acids precipitate it from them unchanged.

URAMILIC ACID ($C_{16}\,H_{10}\,N_5\,O$) has the form of four-sided prisms, which are transparent and of a glassy lustre; it also appears in the state of fine silky needles. Its acid properties are feeble.

URANIA, or RAVENALA, a palm-like genus of *Musaceæ*, confined to the island of Madagascar, where it is called the Traveller's Tree, its petioles, when pierced, always yielding a supply of pure and refreshing liquid, even in the driest season of the year, to the great relief of the thirsty wayfarer. Its stem resembles that of the plantain; but it arranges its leaves in two rows, one on each side, like a pair of wings. The leaf-stalk is from 6 to 8 feet long, and the blade 4 to 6 feet. The fruit grows in three or four bunches, with forty or fifty fruit in each bunch. The urania has been successfully naturalized in Mauritius. It must be propagated by seeds, which will grow freely in a loamy soil, if planted when they are recently imported. It may be numbered amongst the most splendid of our hothouse plants.

URANIIDÆ (Gr. *οὐράνιος*, 'heavenly'), a tribe of Lepidopterous insects, usually placed in the sub-order *Rhopalocera*, which includes a numerous and beautiful species of butterflies, all diurnal in their habits, and flitting about from flower to flower in the warmest sunshine. In the tropical climates the most magnificent and largest species abound.

URANIUM (symbol, U; equivalent, 60; specific gravity, 18·4; combining weight, 120) is a comparatively new metal, having been partially discovered by Klaproth in 1789, and in a purer form by Peligot in 1841. In substance it is hard, but malleable; in colour it resembles iron or nickel; and is closely allied, in chemical relations, with iron and manganese. It is very rare, scarcely ever occurs native, and is principally derived from *uranium ochre*, U_2O_3HO; *uranite*, a hydrated double phosphate of calcium and uranium, $CaO,\,2U_2O_3,\,PO,\,8HO$; *pitchblende*, consisting of the black oxide, U_4O_5, associated with iron, lead, and silica;

and *chalcolite*, which consists of the phosphate of copper and uranium, $CuO, 2U_2O_3, PO_5, 8HO$.

Uranium forms a series of compounds — the protoxide, UO; the peroxide, U_2O_3, which communicates a green or greenish-yellow tint to glass; the black oxide, $2UO, U_2O_3$, of much value in the colouring of porcelain; and the green oxide, UO, U_2O_3. The salts of the protoxide have a green, those of the peroxide a yellow colour. The persalts may be precipitated brown by ferrocyanide of potassium and by infusion of galls.

Amongst the recent utilizations of uranium is the preparation of a new colour, called uranium red, which excels in brilliancy and depth all previous tints. The process of its manufacture is as follows:—

After the liquor containing the sulphide of sodium has been poured into a watery solution of nitrate of uranium, the yellow precipitate which is thus obtained becomes gradually merged into a pale green mass, and suffers no further change in the fluid. But if to the solution of sulphide of sodium we previously add a sufficient quantity of subsulphide of sodium, the green product of the decomposition which is first formed changes for the most part after some months into a matter having a great resemblance to uranium red.

Sulphide of sodium forms a citron yellow precipitate in solutions of oxide of uranium, the same as hydrosulphide of ammonium. This precipitate, treated with a current of sulphuretted hydrogen, and with a solution of caustic soda, which is poured in little by little until saturated, changes into a deep green mass, afterwards into uranium red, provided great care be taken not to employ too great quantities of the reagents.

Very often the change we have just described does not pass beyond the deep green mass. This mass may be warmed by decantation, and then filtered; but if it remains too long in pure water, it is partially transformed into a yellow matter.

From oxysulphide of uranium, recently precipitated and decomposed with an excess of hydrosulphide of ammonium, at a temperature of 40° or 50° Cent., we obtain a suboxide of uranium, which remains stable in the liquid, even for a very long time, so that it does not show any transformation into uranium red. This fact, added to the great partial solubility of the precipitate in dilute hydrochloric acid, is a strong proof that the oxysulphide of uranium does not exist in the free state in this substance, but only arises from decomposition. Again, the liquor of hydrosulphide of ammonia no longer has the same action on the oxysulphide of uranium—prepared pure and dry by the process recommended by the best authorities—as on the mixture recently precipitated.

If this reagent is added to the oxysulphide of uranium, dried *in vacuo*, the liquid is turbid at first, but afterwards becomes clear; the mass passes from red to yellowish red in several places. A complete transformation into a red substance only takes place after a long time.

It is unfortunate that uranium red is almost useless in oil-painting. Were the various shades permanent in contact with the oils, the value of the new colour would be very marked. But if blended with poppy or nut oils, they change in time, and resolve into a tint allied to that of burnt sienna. The uranium reds prepared directly resist the alteration better.

Uranium, in the state of oxide, forms salts with sulphuric, oxalic, nitric, and other acids.

Protoxide of uranium is employed in colouring glass, to which it imparts a fine lemon yellow.

U'RANUS, the name which is now universally g[iven] to a planet discovered by Sir William Herschel, w[hile] engaged in the telescopic comparison of a large n[umber] of stars. On March 13, 1781, about eleven o'cloc[k] the evening, while examining some small stars in Ge[mini], he saw one which appeared to have a more sensible amount of diameter than the others, and this was f[ound] to be a planet. Its six satellites were discovered between 1787 and 1797, also by Herschel.

The name originally given to the new planet was Georgium Sidus, in honour of the reigning king, George III.

Uranus appears like a star of the sixth magnitude, and requires a considerable magnifying power and favourable circumstances to be observed. As soon as it was known to be a planet, a reference to old catalogues showed that it had been seen and noted as a star five times by Flamsteed, once by Bradley, once by Mayer, and twelve times by Lemonnier, who were under the impression that it was a fixed star.

The orbits of all the six satellites differ in two material particulars from those of every other body in the solar system. They are nearly at right angles to the plane of the ecliptic (78° 58′) and their motions are retrograde, or from east to west.

The mean distance of Uranus from the sun is 19·18239, whence its real distance is upwards of 1,800,000,000 miles. It performs its sidereal revolution in about eighty-four Julian years. Its orbit is inclined to the ecliptic in an angle of only 46′ 28·4″. Its real diameter is about 35,000 miles, or nearly four and a half times that of the earth; its bulk about eighty times that of our planet.

URA'RIA, a genus of plants of the natural family of *Leguminosæ*. The species are chiefly natives of India. *U. picta* is found both in that country and on the coast of Guinea, and *U. lagopoides* both in India and China.

URBI'NO (anc. *Urbinum Hortense*), a city of Central Italy, in the Marches, capital of the province of Urbino and Pesaro, formerly capital of a duchy, 20 miles S.W. of Pesaro. Population, 15,095. It has an old ducal palace and a cathedral, adorned with fine works of art, a college, diocesan seminary, an extensive manufactory of pins, four annual fairs, and the house of Raphael, who was born here in 1483. It is also the native place of Baroccio, Baldi, and Pope Clement XI. In the fifteenth century it was the seat of a splendid ducal court, but the duchy was joined to the papal states in 1626, and continued to form part of them till 1860, when it was annexed to the kingdom of Italy. The walls of the town are good specimens of the architecture of the fourteenth century.

U'RCEOLA (Lat. *urceus*, 'a pitcher'), a genus of plants of the natural family of *Apocynaceæ*. It is confined to the Malayan Peninsula, and the islands of Sumatra and Penang. From wounds made in the bark of this plant there oozes out a milky fluid, which on exposure to the atmosphere separates into an elastic coagulum, and watery liquid apparently of no use. After the separation takes place, this coagulum is not only like American caoutchouc, or india-rubber, but possesses the same properties. Dr. Roxburgh states that a ball of it had the appearance of American caoutchouc. When cut into it was of a light-brown colour, till the action of the air darkened it. This ball, measuring 9½ inches in circumference, and weighing 7¾ ounces, in simply falling from a height of 15 feet, rebounded about ten or twelve times, which is of itself an indication of the goodness of the caoutchouc.

URCEOLA'RIA, a genus of Lichens, belonging to the family *Lecanoreæ*. Hooker in his 'British Flora' enumerates six British species of *Urceolaria*. They are generally found on rocks, stones, and walls. Two species, *U. scruposa* and *U. cinerea*, are used for dyeing.

URCHIN. [ECHINIDÆ.]

URE, ANDREW, M.D., an eminent chemist, and successful scientific writer, was born at Glasgow in 1778. He completed his education at the Glasgow University, where he received the degree of M.D. in 1801. In the following year he was appointed professor of natural philosophy and chemistry in the Andersonian University. Having laboured very zealously to secure the establishment of an observatory at Glasgow, he was attached to it, in 1809, as its first astronomer. His first publication was a 'Systematic Table of the Materia Medica,' in 1813, and his second, a valuable paper, entitled 'Experimental Researches on the Leading Doctrines of Caloric,' printed in the Philosophical Transactions of the Royal Society. In 1821 appeared his elaborate 'Dictionary of Chemistry;' in 1822, 'The Ultimate Analysis of Animal and Vegetable Substances;' and, in 1829, a 'System of Geology,' in which he supported the now exploded hypothesis of an universal deluge. Having removed to the metropolis, he received, in 1834, the appointment of analytical chemist to the Board of Customs, in which position he acquired and maintained a deservedly high reputation. He displayed great ingenuity in devising and improving volumetrical methods of analysis, which proved of much value for commercial testing. In 1835 Dr. Ure published his 'Philosophy of Manufactures;' in 1836, his 'Cotton Manufactures of Great Britain;' and in 1839 his most important work, which is still held in general estimation, the 'Dictionary of Arts and Manufactures.' A revised edition was issued in 1853, and an enlarged one in 1860, three years after its author's death, which took place in London, on the 2nd of January, 1857.

U'REA is a principle proper to the urine of man and quadrupeds, and perhaps of all animals. It was first detected by Rouelle, and afterwards more fully examined by Fourcroy, Vauquelin, and Prout. In its solid and pure state, urea crystallizes in the form of long prismatic needles, which are white and transparent, having somewhat the lustre of mother-of-pearl, with a taste approaching that of nitre, and none at all of the fluid which furnishes it. It is neither sensibly acid nor alkaline. The specific gravity of the crystals is 1·35. It fuses at 250° into a colourless fluid, and at a higher temperature is converted into ammonia, cyanite of ammonia, and dry solid cyanuric acid. It is soluble in its own weight of cold water, and still more so in hot water. Alcohol of specific gravity 0·816 dissolves one-fifth of its weight of urea at 60° Fahr. It is very sparingly soluble in ether and turpentine. The caustic alkalies decompose urea, and with the assistance of heat convert it into carbonate of ammonia. The nitric and oxalic acids combine with urea, forming salts more or less insoluble. Its formula is $C_2 H_4 N_2 O_2$.

URE'DO (Lat. *uro*, 'I burn'), a genus of Cryptogamic plants belonging to the natural order of *Fungi*.

All the species are known by having their sporidia, or spore cases, free or stipitate, and situated beneath the cuticle of living plants. On examining any one of the productions thus constituted, it will be found that the part of the plant on which they are placed has lost its natural colour and other characters. The cuticle under which they grow is discoloured, frequently raised, and bursts in the process of time.

The species are exceedingly numerous. In fact they seem to vary with every plant they attack, and have thus given rise to specific names according to the plants on which they are found, as *Puccinia*, *Primulæ*, *Æcidium berberidis*, *Uredo violarum*, &c.

Uredo rubigo and *linearis* form yellow and brown oval spots, and blotches of an orange and yellow colour upon the stem, leaf, and chaff of corn, and various grasses. The sporidia of *U. linearis* are more oblong than those of *U. rubigo*, but they are frequently found together. When these plants are present the disease of the corn is called Rust, Red-rag, Red-robin, and Red-gum. This is the plant which Henslow believes to be identical with the *Puccinia graminis*, which occurs in corn affected with mildew.

URE'NA, a genus of plants of the natural order *Malvaceæ*, whose species form small shrubs, indigenous in India and the Indian islands, China, Mauritius, South America, and the West Indies. *U. scabriuscula* is said to be found both in India and Brazil. The flowers of all are red. Few of the species are sufficiently ornamental to be worth cultivation except *U. speciosa*.

URETHRA, in Anatomy, the membranous tube or canal by which the urine is discharged from the bladder. It is liable to inflammatory affections, of which the best known are gonorrhœa and stricture. The tube which conveys the urine from the kidney to the bladder is the ureter (Gr. οὐρητήρ). [BLADDER.]

URGINEA, a genus of monocotyledonous plants belonging to the natural order *Liliaceæ*. This genus is equivalent to the genus *Scilla* of some botanists. It consists of bulbous-rooted plants, natives of Europe and of Southern Africa. One species, the Sea-squill (*Urginea maritima*), is well known as supplying the medicine called squill, which is much used in cases of coughs as an expectorant. It is also employed as an emetic, and in cases of dropsy as a diuretic. It grows on the sands bordering the Mediterranean. The dried bulb constitutes the squill of commerce. The bulb is noted for its acrid taste, and yields a bitter principle known as *scillitine*. In India the *Scilla Indica* is used as a substitute for the European species.

URI, one of the Swiss forest cantons, is bounded N. by Schwyz, W. by Unterwalden, Bern, and the Valais, S. by the group of the St.-Gothard, which separates it from the canton of Ticino, and E. by the Grisons and Glarus. The area is 422 square miles, and the population in 1860 was 14,741, all of whom were Roman Catholics. The canton consists chiefly of a valley about 30 miles long, and drained by the Reuss, which rises in Mount St.-Gothard, and flows northwards into the Lake of Lucerne. The southern branch of this lake is called the Bay of Uri. A high road, connecting Uri with Ticino—and forming part of the great route between Switzerland and Italy over the St.-Gothard—passes through the valley. The canton is so hemmed in by mountains that this road, and Lake Lucerne, are the only practicable outlets. Several minor valleys branch out right and left from that of the Reuss. There is a tract of open country in the lower part of the valley of the Reuss, near the shore of the Lake of Lucerne. Uri is essentially a pastoral district: horned cattle, sheep, and goats, are numerous, and it is upon their produce that the inhabitants almost entirely depend. In the lower grounds the soil is fertile, producing abundance of fruits, vegetables, &c.

The constitution of Uri is strictly democratic. The legislative power is vested in the General Assembly, composed of all the male population above twenty years

of age, who meet in a meadow every year on the first Sunday in May, to choose the cantonal council. To the latter is confided the direct executive power. The communes are too poor to support schools all the year round, and education is very backward. Uri is supposed to have derived its name from *urus*, or 'the wild bull,' which formerly inhabited the valley in great numbers. This was one of the three cantons which revolted from the German empire in 1307, and formed the nucleus of the Swiss Confederation, in which it now holds the fourth place. It was the chief theatre of the war between France and Austria in 1799–1800. The principal town is ALTORF.

This is one of the most mountainous of the Swiss cantons, presenting a complete chaos of deep ravines, narrow valleys, and mountain masses, none of which are less than 5000 feet high, while the greater part are 8000 or 9000 feet, and several more than 10,000 feet above the sea.

URIA. [GUILLEMOTS.]

URIC ACID ($C_{10}H_4N_4O_6$). This substance, sometimes called *Lithic acid*, was discovered by Scheele; Vauquelin afterwards found it in the excrements of serpents, Brugnatelli in that of silkworms, and Robiquet in cantharides.

It is secreted by carnivorous animals, birds, and by several insects. It is deposited from human urine, as it cools, in a yellow or brownish-yellow powder, which is usually a compound of uric acid and ammonia. It occurs, in combination with soda of ammonia, in those gouty concretions commonly called Chalk Stones, and it constitutes the principal portion of the calculi deposited in the human bladder. The semi-fluid urine of serpents and birds is chiefly composed of urate of ammonia; and guano, which has been imported from some islands on the South American coast and elsewhere, and extensively used as a manure, contains a large quantity of that substance, which is the decomposed excrement of aquatic birds.

URIM and THUMMIM (Heb. 'light' and 'perfection'), the name of a mysterious kind of ornament worn in the habit of the Jewish high-priest, which was consulted as an oracle on occasions of importance. Various are the conjectures upon this subject; and the Scriptures do not appear anywhere to elucidate the mystery. We learn that when the Urim and Thummim was to be consulted, the high-priest put on his robes, and going into the holy place stood before the curtain that separated the sanctum from the sanctuary; then turning his face directly towards the ark and the mercy-seat over it, upon which the divine presence rested, he proposed what he wanted to be resolved about; and directly behind him, at some distance, without the holy place, stood the person at whose command or entreaty God was consulted; and there, with all humility and devotion, expected the answer. The ceremony was probably of Egyptian origin; for we are informed by Diodorus Siculus that there was a similar form in use among the Egyptians, whose principal minister of religion and justice wore a collar of precious stones about his neck, which was called 'Αλήθεια, or 'Truth.' According to the testimony of Josephus, the oracular ceremony of the Urim and Thummim ceased about 112 B.C.

URINE (Gr. οὖρον, 'water') is a fluid secreted from the blood by the kidneys. Every excretory organ performs some special office: the lungs clear the system of its excess of carbon; and the kidneys purify it of azote and saline matter. Besides secreting a peculiar azotic substance, the kidneys have an oxygenating power, for the sulphur, phosphorus, calcium, &c., of the blood are changed to acids and oxides, or earths, by the glandular energy of these organs.

The urine of a healthy person when recently voided is acid, transparent, usually of a pale amber or straw colour, a brackish taste, peculiar odour, and of a specific gravity varying from 1·010 to 1·030.

The character of the urine is affected by the seasons. In winter the kidneys are excited to greater activity than in summer. In cold weather the perspiration is more or less suppressed; and were it not that the action of the kidneys is increased, we should be liable to plethoras, or repletions of the most dangerous nature. Hence it happens that when the perspiration is abundant, the urine is scanty and high-coloured, and contains a strong impregnation of saline ingredients. When the perspiration is checked by any cause, the urine is copious, limpid, and its proper salts more diluted.

Healthy urine is always acid; it becomes ammoniacal only by a prolonged exposure to the atmosphere, for it remains perfectly unchanged if kept in a vessel well stopped.

In health the quantity passed in twenty-four hours is subject to variation from the temperature, diet, and exercise of the individual, as well as other circumstances, and it is therefore impossible to fix a standard applicable to every case. If we consider that the quantity varies in this country from 30 ounces in the summer to 40 ounces in the winter, we should probably be very near the truth as regards a person in good health, and who does not drink more than nature requires.

The following table shows the constituents which enter into the composition of 1000 parts of healthy human urine:—

Solid matter, 43·2	Water,	956·80
	Urea,	14·24
	Uric acid,	0·37
	Alcoholic extract,	12·54
	Watery extract,	2·51
	Vesical mucus,	0·16
	Chloride of sodium,	7·22
	Phosphoric acid,	2·12
	Sulphuric acid,	1·70
	Lime,	0·22
	Magnesia,	0·12
	Potash,	1·94
	Soda,	0·06

In addition to these matters, which constantly exist in healthy urine, the fluid occasionally contains a variety of other substances, as sugar, bile, albumen, fibrin, fat, blood, &c.

Most of the substances found in healthy urine may exist in excess when they indicate diseased states of the system. Sometimes these are deposited in the bladder, forming concretions. [CALCULI.] When these are found in the urine which do not exist there naturally, they always indicate disease.

URNS, among the Greeks and Romans, were round-shaped vases, chiefly used for preserving the ashes and remains of deceased relatives or friends, after they had been burnt upon the funeral pile. They were chiefly made of a bluish-gray, red, or blue colour; though sometimes, for persons of high condition, they were gold, silver, or brass. The Hamilton collection of cinerary urns, in the British Museum, presents some admirable specimens, illustrative of their form and composition.

URSA MAJOR and URSA MINOR (the Greater and Lesser Bear), two of the most remarkable constel-

lations of the northern hemisphere: the latter as containing the pole star, or the visible star which is nearest to the northern pole of the heavens; the former from its well-known seven stars, by two of which the pole star is always readily found. These seven stars are disposed in the form of a quadrangle joined by one of its corners to a triangle. The pole star is the principal one in Ursa Minor, which has seven stars placed together in a manner very much resembling Ursa Major, the pole star being the corner of the triangle which is farthest from the quadrangle.

The common people of most countries call the seven stars of the Great Bear by the name of 'the waggon,' sometimes by that of 'the plough.' Arátus says that both the bears were called waggons by the Greeks; and 'Charles' Wain' is familiar to many readers.

URSIDÆ, a group or family of carnivorous quadrupeds, of which the bears are the typical representatives. [BEAR.] The gluttons belong to the *Mustelidæ*, and not to the *Ursidæ*. [GULO; WEASELS.]

Most authors assign to this family the Raccoons (*Procyon*, Storr), and the Ratels (*Mellivora*), but the latter decidedly belong to the *Mustelidæ*. On these animals, however, we may here make a few observations.

The Raccoon (*Procyon Lotor*, Storr; *Ursus Lotor*, Linn.), is the *Raton* of the French; *Raccoon* ('Coon in clipped language) of the Anglo-Americans; and *Raccoon Bear* of Pennant.

Geographical Distribution.—'This animal,' says Dr. Richardson, 'inhabits the southern parts of the fur districts, being found as far north as Red River, in lat. 50°, from which quarter about 100 skins are procured annually by the Hudson's Bay Company. If there is no mistake as to the identity of the species, the Raccoon extends farther north on the shores of the Pacific than it does on the eastern side of the Rocky mountains. Dixon and Portlock obtained cloaks of Raccoon skins from the natives of Cook's River, in lat. 60°, and skins supposed to be of the Raccoon were also seen at Nootka Sound by Captain Cook. Lewis and Clarke expressly state that the Raccoon at the mouth of the Columbia is the same with the animal in the United States. Desmarest says that the Raccoon extends as far south as Paraguay.'

Habits, &c.—The negroes of Georgia, near Savannah, declare, at the present day, that at low tide the Raccoons go down to the shore, open and eat oysters, and that occasionally when they put their paw in to take out a large-sized oyster (those molluscs are often of great size in that locality), the oyster closes his shell, and holds the Raccoon in this living trap till the flowing tide drowns the four-footed burglar, unless the 'coon manages to bite off his paw and escape in time.

As an example of the Ratels, we may adduce the *Mellivora Capensis*. This is the *Viverra Capensis* of Schreber, *Gulo Capensis* of Desmarest, *Mellivora Capensis* of F. Cuvier, *Viverra mellivora* and *Ursus mellivorus* of Blumenbach, *Ratel* of Sparrmann, *Fizzler Weesel* and *Ratel* of Pennant, *Honey Weesel* of Shaw, *Honig Freter* of the Dutch Cape colonists, and *Blaireau Puant* of Lacaille.

Mr. Bennett observes that this animal was first clearly described by Lacaille in his 'Voyage to the Cape,' under the misapplied designation given above as the last synonym. This unmerited epithet, he remarks, has, in all probability, given rise to the general opinion that it is also the animal referred to by Kolbe as the *Stinkbinksen* of the Dutch colonists; but there is scarcely any part of his account of that disgusting creature which fairly warrants the inference. It is far more likely, Mr. Bennett thinks, that his beast was the *Zorille*, to which alone, of all the animals of Southern Africa, its manners bear a close resemblance. Sparrmann described it with tolerable accuracy, under its Hottentot and Colonial designation, which it still retains. Gmelin and Shaw have subdivided these synonyms and formed two species, *Viverra Capensis* and *Viverra mellivora*. Pennant, who gives the designations of Lacaille, Sparrmann, and Kolbe, under his title *Ratel*, saw John Hunter's living Indian specimen, treated it as distinct from the African animal, and called it the *Indian Badger*, out of which Shaw made his *Ursus Indicus*.

Geographical Distribution.—South Africa.

Habits, &c.—The hide of this quadruped is so tough and loose that, according to Sparrmann, if anybody catches hold of it by the back part of the neck, it is able to turn round, so to speak, in its skin, and bite the offending arm. The claws of the fore-feet are longest, and well formed for grubbing. The bees, according to the description of the author last quoted, who drew his information from the Hottentots, furnish the principal means of subsistence to the Ratel. These insects in that part of South Africa where the animal is found, usually inhabit the deserted lairs and burrows of the Ethiopian Boar, the Porcupine, &c., and according to the accounts given, the Ratel, which preys in the evening, ascends to the highest parts of the desert to look out, and will then raise its paw before its eyes to prevent their being dazzled by the sun. Here he watches and listens for the Honey-guide Cuckoo [INDICATORINÆ], which serves both the Hottentot and quadruped as a conductor to the bees' store, or for the flight of the bees themselves. If the beast can trace the guide or the insect it follows, and if the nest be on the ground or near it, it undermines it with its natural digging instruments, and secures the contents. If the nest be in a tree, the Ratel, which cannot climb, gnaws the trunk in its unavailing rage, leaving marks which the Hottentot well knows as indicative of the treasure above.

The Indian Ratel is a distinct species, but agrees with the African in general habits and manners.

URSULINES, an order of nuns in the Roman Catholic church, founded about 1537 by Angela Merici, commonly called Angela da Brescia, who was born in 1511 at Desenzano, on the Lago di Garda, and died at Brescia, March 21, 1504. The institution was confirmed by Pope Gregory XIII. in 1577, and it was upon this occasion that the name of Ursulines was given to the order, after the British St. Ursula. The first house of Ursuline nuns was founded at Paris, in 1604, by Madame de Sainte Beuve. For further information respecting the Ursulines, both of France and other Roman Catholic countries, the reader may consult Helyot's 'Histoire des Ordres Monastiques.'

URSUS. [BEAR; URSIDÆ.]

URTICA, a genus of plants known under the common name of Nettle. Nettle is the same word as the Anglo-Saxon *netel* or *nædl*, 'a needle,' which is applied to these plants on account of their possessing small bristles or prickles which have a stinging property. This genus is the type of the natural order *Urticaceæ*. Most of the species, of which there are about forty, are herbaceous plants or under-shrubs, and are found in Europe, Asia, and America: three of these are natives of Britain.

Urtica piluifera, the Roman Nettle, is found in England, under walls and amongst rubbish, principally near the sea, in the counties of Norfolk and Suffolk. It has

what he thought to be a new coast: he was obliged, however, to retire on account of the icebergs. Having remained for some time at Conception, he made a second attempt, and discovered a coast at 66° 33′ S. lat., and 138° 21′ E. long. On his return to Paris he published an account of this expedition with the official reports of the minister of marine, Paris, 1839.

D'Urville met with his death, May 8, 1842, in a railway accident that occurred between Versailles and Meudon, by which himself, his wife and son, and nearly fifty passengers, were killed.

USAGES. [CUSTOMS.]

USBEKHISTAN. [BOKHARA.]

USE. A use, at common law, was a beneficial interest in land, distinct from the legal property therein. The origin of uses is derived by Gilbert ('Law of Uses,' 3) from a title under the civil law, which allows a usufructuary interest, distinct from the ownership of the thing itself. He says it was introduced by the clergy, who were masters of the civil law, and who 'when they were prohibited from taking anything in mortmain, after several evasions by purchasing lands of their own tenants, suffering recoveries, purchasing lands round the church and making them churchyards by bull from the pope, at last invented this way of conveying lands to others for their own use; and this being properly matter of equity, it met with a very favourable construction from the judge of the Chancery court, who was in those days commonly a clergyman. Thus this way of settlement began; but it more generally prevailed among all ranks and conditions of men by reason of the civil commotions between the houses of York and Lancaster, to secrete the possessions, and to preserve them to their issue, notwithstanding attainders; and hence began the limitation of uses with power of revocation.' But whatever may have been the origin of uses, it is certain that the desire of effecting secret transfers of property without resorting to the modes of conveyance of the common law, as well as the desire to dispose of landed property by will or devise, which the common law did not allow, led to an early adoption of the system.

The person who was entitled to the use was called the *cestui que use*. He had no means of maintaining his title to the use except by the writ of subpœna, whereby the person who had the legal estate in the land, the feoffee to uses, was bound to appear in Chancery, and was compelled to answer upon oath as to the confidence reposed in him.

A use was descendible, according to the rules of the common law respecting estates of inheritance. It was also alienable by deed, and devisable before the statute of wills, the courts of equity having favoured this method of evading the strictness of the common law, which allowed no transfer of land without livery of seisin. But the *cestui que use* had no legal ownership. The feoffee was still complete owner of the land at law. He performed the feudal duties, his wife had dower, and his estate was subject to wardship, relief, &c. He might sell the lands, and forfeit them for treason or felony.

The system of uses having been found to produce many inconveniences, notwithstanding various statutes which had been passed from time to time to modify them, it was thought a remedy would be found by joining the possession to the use, or, as it is usually termed, transferring uses into possession. With this view the statute of 27 Hen. VIII. c. 10, commonly called the Statute of Uses, was passed. The provisions of this statute can only be fully explained in a treatise on the system of uses. On the Statute of Uses has been founded the system of conveying and making settlements of property in land which is now in use in England.

The subject of uses is treated in Sanders, *On Uses and Trusts*; in Gilbert, *On Uses*, by Sugden (Lord St. Leonard's); and in Hayes, *On Uses*.

The term *Use* is not known in Scotland in the sense of the English law. The equivalent right is denoted by the term *Trust*. Those who *nominally* hold the title are termed *Trustees*, and those for whose benefit the trust exists are called *Beneficiaries*. (M'Laren, *On Trusts*.)

USES, CHARITABLE AND SUPERSTITIOUS. The term 'Charitable Use' has a very extensive legal meaning, and includes dispositions of property which are not in ordinary language described as charitable, but which are so called with reference to the purposes enumerated in the statute 43 Eliz. c. 4, or such as are considered analogous to them. That statute enacted that the commissioners thereby empowered should inquire as to the lands, &c., given by well-disposed people 'for relief of aged, impotent, and poor people; for maintenance of sick and maimed soldiers and mariners; schools of learning, free-schools, and scholars in universities; for repair of bridges, ports, havens, causeways, churches, sea-banks, and highways; for education and preferment of orphans; for or towards the relief, stock, or maintenance of houses of correction; for marriage of poor maids: for supportation, aid, and help of young tradesmen, handicraftsmen, and persons decayed; and for relief or redemption of prisoners and captives, and for aid or ease of any poor inhabitants concerning payment of fifteens, setting out of soldiers, and other taxes.' The term Charitable Use is applicable only to gifts for what are called public charities, the objects of which are not particular individuals, but a class or the public in general.

If lands, tenements, rents, goods, or chattels, were given, secured, or appointed for or towards any of the following purposes: for the maintenance of a priest or other man to pray for the soul of any dead man in such a church or elsewhere; to have or maintain perpetual obits, lamps, torches, &c., to be used at certain times to help to save the souls of men out of purgatory—these or the like purposes are declared to be Superstitious Uses by 1st Edward VI. c. 14. It is now an established rule of law that gifts for superstitious uses generally are void, and many gifts have by the courts been declared to be for superstitious uses which are not such in the ordinary acceptation of the term. A change in the doctrine of superstitious uses was made by the 2 & 3 Will. IV. c. 115, which puts persons professing the Roman Catholic religion upon the same footing, with respect to their schools, places for religious worship, education, and charitable purposes, as Protestant dissenters; with respect to whom the doctrine of the court is, that it will administer a fund to maintain a society of Protestant dissenters promoting no doctrine contrary to law, though at variance with that of the established church. The 2 & 3 Will. IV. c. 115, is retrospective. (2 M and K. 225.)

The 24 Vict. c. 9 was passed to amend the law relating to the conveyance of land for charitable uses, and provided that no future deed for charitable uses should be void by reason of its not being indented, nor by reason of its containing any stipulations for the benefit of the donor, nor in case of copyholds by reason of the assurance thereof not being made by deed. It also provides that if any of the uses are declared by any separate deed, it must be enrolled in Chancery within six months after

the making thereof. It also contains other provisions not necessary to be mentioned here.

The subject of 'Charitable Uses' is closely connected with that of 'mortmain,' for the same policy which from the earliest times required corporate alienees of lands to obtain licenses to hold them from the Crown (a policy enforced and extended by Edward I. in the statute *De Religiosis*, and again by Richard II. in reference to the then newly invented conveyance of lands to the use of religious houses), was soon held to extend to the case where lands, though not conveyed to corporate bodies, were given on trust for what were called superstitious uses; that is to say, to large bodies of trustees, with ultimate survivorship, for parish churches or other institutions 'erected and made of devotion.' And such grants were by statute 23 Hen. VIII. c. 10, declared to be void if made for a longer time than twenty years, a restriction which is still in force, unless in a case where the provisions of some of the modern Acts for augmenting poor livings and similar objects apply. See, for example, 17 Car. II. c. 3, and the 19 & 20 Vict. c. 104, sec. 23, for making better provision for the spiritual care of populous parishes.

It is true that the statute of Henry VIII. has been held not to apply to charitable as distinct from superstitious uses; and therefore that lands may well be given to trustees for the maintenance of a school or the sustenance of the poor, and the like; but even these uses are fettered by the statute 9 Geo. II. c. 36 (passed, it is said, for the protection of heirs against the improvident dispositions of their ancestors on their death-beds), and by that Act a variety of restrictions must be observed in order to render valid a conveyance of land, or of money to be laid out in the purchase thereof, in trust for any charitable use.

The object of the Act 24 Vict. c. 9 was to relax the rigour of these restrictions, in certain cases where they had hitherto worked injustice or frustrated charitable intentions without any compensatory advantage. (*Solicitors' Journal.*)

The Court of Chancery has a general jurisdiction over property given for charitable purposes, and the regular mode in which matters relating to charities are brought before it is by information by the attorney-general on behalf of the crown.

The statutes above cited do not apply to *Scotland*, where the legality of any grant (or as it is there called, *mortification*) of lands or money is ruled by the common law.

USHANT. [Finisterre.]

USHER or USSHER, JAMES, the celebrated scholar and archbishop of Armagh, was born at Dublin, 4th January, 1580. He was well taught in a school at Dublin; and in 1593 he went to the newly-opened university of Trinity College, Dublin, of which he was one of the first three students that were admitted.

He had already acquired a high academic reputation, when in 1598 the death of his father, who had intended to educate him for the law, left him at liberty to follow his own inclinations, which led him to the study of theology. He took his degree of M.A. in 1600, and in the following year was ordained deacon and priest by his uncle, the archbishop of Armagh.

In 1603 and 1606 he visited England, and became acquainted with Sir Thomas Bodley, Sir Robert Cotton, Camden, and other distinguished persons; and subsequently he occasionally made a journey to England. In 1607 he was chosen professor of the faculty of divinity in his college, and he held the office for thirteen years. In 1620 King James made him bishop of Meath, and in January, 1624, while he was in England, he was raised to the archbishopric of Armagh and the primacy of the Irish Church.

In 1641 his house at Armagh was attacked by the rebels, and he was plundered of nearly everything that he had. Upon this, Charles I. conferred on him the bishopric of Carlisle *in commendam;* but the revenues of the bishops were shortly afterwards confiscated by the Parliament, and Usher did not receive the pension of 400*l.* a year that was allotted for his support above once or twice. Meanwhile, continuing to reside mostly at Oxford, where he preached every Sunday, he published there, in 1644, in 4to, an edition, in Greek and Latin, of the Epistles of Polycarp and Ignatius, reprinted at London in 1647. In 1647 he was chosen preacher to the Society of Lincoln's Inn, upon which he took up his residence in the Inn, and had his library, the only part of his property he had saved, removed thither. He preached regularly during term time in the chapel of the Inn for nearly eight years. In 1650 he published at London, in folio, the first part of his 'Annales Veteris et Novi Testamenti,' which was followed by the second part in 1654; other editions of both parts, all in folio, appeared at Paris in 1673, at Bremen in 1675, and at Geneva (the best) in 1722. He died at Lady Peterborough's house at Reigate, in Surrey, after a day's illness, on the 21st of March, 1656; and his remains were interred in Westminster Abbey by order of Cromwell.

USK. [Monmouthshire.]

USNIN, or USNIC ACID (C_{38} H_{16} O_{14}), a substance extracted from different lichens of the genus *Usnea*, which is sometimes called usnic acid, because it possesses slightly acid characters, and forms crystallizable compounds with the alkalies. Its crystals are yellow, and fuse with difficulty.

USQUEBAUGH (Irish, *uisge*, 'water,' and *bagh*, 'life'). A compound distilled spirit made at greatest perfection at Drogheda in Ireland. The term is applied technically to a strong compound spirit, consisting of an infusion of brandy, liquorice, raisins, cinnamon, nutmeg, aniseed, citron, thyme, rosemary, sugar-candy, and other ingredients. It is chiefly taken as a dram. From this word we have by contraction whisky.

USSEL. [Corrèze].

USTJUG VELIKI, a considerable town in the Russian government of Vologda, situated in 60° 47′ N. lat., 46° 5′ E. long., at the confluence of the Suchona and the Jug. [Dwina.] It is an old town with about 13,000 inhabitants; the houses are for the most part of wood. The town, being situated on the direct road from Archangel to Siberia and the southern provinces, is very important in a commercial point of view. There are tallow, soap, candle, leather, and tile factories, and the town has a good trade in corn, lard, linen, ship timber, and sailcloth. There is an important annual fair on the 8th of July.

USURY. This word comes from the Latin *Usura*, or as it is more frequently used, *Usuræ*, in the plural number. The Latin word signifies money paid for the use of money lent. The old word in use in England to signify what we now call interest, seems to have been Usury. But usury now means taking more interest for the loan of money than the law allows.

Interest is money which is paid for the use of other money, called Principal. The general practice is this: the borrower agrees to pay a fixed sum yearly, half-yearly, or quarterly, for each 100*l.* lent, until the money lent is returned. When this is not the case, and

when the money paid for the loan depends upon the success of an undertaking, or any casualty not connected with the duration of life, it is called a *Dividend:* when the money and its interest are to be returned by yearly instalments, and paid off in a certain fixed number of years, it is called a *Terminable Annuity;* but when the payment is to depend upon the life of any person or persons, it is called a *Life Annuity.* But by whatever name the proceeds of money may be called, the rules of calculation are the same in every case except that of a life-contingency.

The laws which regulate and limit the rate of interest in this country having been made by those who were among the class of borrowers rather than that of lenders, may perhaps afford some explanation of the views of the legislature in putting restrictions on the trade in money. That these restrictions, however, were unfavourable both to lenders and borrowers, and more unfavourable to the borrowers than the lenders, may easily be demonstrated.

A statute passed in 1545 limited the rate of interest to 10 per cent. per annum; in 1624 the rate was lowered to 8 per cent., in 1660 to 6 per cent., and by the statute 12 Anne, st. 2, c. 16 (1713), it was further reduced to 5 per cent., beyond which rate, with the exceptions which will be mentioned, it was until recently illegal to charge.

The law does not recognize the charge of interest upon interest, or, as it is called, compound interest. This, however, is a rule easily evaded by the borrower granting a further acknowledgment of the interest as though it were principal: such new contract changes the interest already due into a principal sum. The law also recognizes rests in mercantile and banking accounts, in which interest is charged upon a former ascertained balance. Such balance often includes interest already due; and thus the creditor really receives interest upon interest, or compound interest.

Debts do not always carry even simple interest from the time when the money becomes due to the creditor: in such case payment of interest is rather the exception than the rule. Unless the debt be such a debt as carries interest by the custom of merchants or traders, or unless there is an express agreement to such effect between the parties, or unless such agreement can be inferred from their course of dealing, or unless there are some very special circumstances, debts do not carry interest from the time when due. But by 3 & 4 Will. IV. c. 42, a jury may, if they think fit, upon all debts or sums certain, allow interest to the creditor, at any rate not exceeding the current rate of interest, from the time when such debts or sums were payable, if payable by virtue of a written instrument at a certain time; or if payable otherwise, then from the time of a demand of payment in writing, so as such demand give notice that interest will be claimed from the date of such demand. This statute also empowers juries to give damages, in the nature of interest, in respect of the detention or appropriation of goods. By 1 & 2 Vict. c. 110, all judgment debts are to carry interest at the rate of 4 per cent. per annum from the time of entering up the judgment.

The relaxation above mentioned as having been made as to the rate of interest formed part of the arrangement made in 1833, at the renewal of the charter of the Bank of England. (3 & 4 Will. IV. c. 98.) It consisted in excepting from the operation of the statute all bills of exchange and promissory notes not having more than three months to run previous to their maturity; these might be discounted at any rate of interest agreed upon with the holder. By the Act 1 Vict. c. 80 (July, 1837), this relaxation was extended to all mercantile instruments which have not twelve months to run before they are due. However, by the 17 & 18 Vict. c. 90, the whole of the usury laws were repealed, and it is now lawful to contract for any amount of interest. This Act applies to Scotland.

UT, in Music, the French name for the first note of the solfeggio, the Italian *do*, and the English C.

UTAH, a territory of the United States of North America, originally a part of Upper California, ceded to the United States by the treaty with Mexico in 1848, was erected into a separate territory in 1850. It is bounded on the N. by the territory of Idaho, on the E. by Colorado, on the S. by Arizona, and on the W. by Nevada. It lies between 37° and 42° N. lat., and between 109° and 115° W. long., being about 345 miles in extreme length from N. to S., and 320 miles wide from E. to W. The area is estimated at 108,000 square miles, or 69,120,000 acres, of which 77,219 only were improved in 1860.

Face of the Country.—This territory is generally an elevated, mountainous, and barren region. The central part is traversed by the Wasatch mountain range, the direction of which is nearly north and south. The portion of Utah which lies W. of this mountain range forms part of the Great or Fremont Basin, which has a general elevation of 4000 or 5000 feet above the level of the sea. This arid and sterile basin has its own system of lakes and rivers, which have no communication with the ocean. The eastern part of it is covered with a white incrustation of saline and alkaline substances. The Wasatch mountains rise to a height varying from 4000 to 7000 feet above the adjacent plains or valleys, and some of the peaks are covered with perpetual snow. Other ranges of mountains occur in various parts of Utah. Some of the valleys in the settled part of the territory have an elevation of about 6000 feet above the level of the sea. On the E. side of the Wasatch mountains is an extensive plain or valley, almost as sterile as that which occupies the western part of Utah.

Of the geology of Utah as yet comparatively little is known. Volcanic rocks are found in various parts, and granite, jasper, syenite, porphyry, and quartzes are abundant. There are also ridges of carboniferous limestone, and marble of all colours is found in large masses on the slopes of the mountains in many places.

Lakes and Rivers.—Great Salt Lake is the prominent object to be considered in treating of the waters of Utah. This extensive and peculiar sheet of water, lying N.E. from the centre of the territory, is about 70 miles long and 30 miles wide, with no visible outlet. The water is so highly saline that no living thing can exist in it, and by the evaporation in hot weather leaves on its shores a thick incrustation of salt. According to Fremont's analysis of some of the salt of this lake, there were in 100 parts 97·80 of chloride of sodium, or common salt; sulphate of lime, 1·12; chloride of magnesium, 0·24; and sulphate of soda, 0·23. In the saltness of its waters, in the circumstance of its having no outlet, and being fed from another smaller and fresh-water lake (with which it is connected by a stream called the 'Jordan'), and in the rugged and repulsive character of some portions of the surrounding region, it bears a remarkable resemblance to the Dead Sea of Palestine. Instead, however, of lying 1000 feet below, it is more than 4000 feet above the level of the sea: its waters, moreover, being an almost pure solution of common salt, are five

from that pungency and nauseous taste which characterise those of the Dead Sea. The water is almost transparently clear, and of an extremely beautiful bright green colour. The fresh-water lake which is connected with the Great Salt Lake is about 25 miles distant. It is nearly 35 miles in length, and is stored with trout and other fish. Both lakes are elevated from 4200 to 4500 feet above the sea. In the interior are several small lakes, which are the recipients of the streams of the interior basin, and are often mere sinks or sloughs. The most important of those known is Sevier Lake. There are many thermal and salt springs.

As before stated, the rivers of the Great Basin have no apparent connection with the ocean, but all either discharge themselves into the interior lakes or are absorbed by the sands of the desert. The principal streams of Utah are the Colorado, the Green, the Grand River, the Sevier, and the Bear River. Only a small part of the Colorado is included in this territory. Green River, after crossing the northern border, traverses the eastern part of Utah, flowing S., and unites with the Grand River to form the Colorado, which flows S.W. into Arizona. Grand River, rising in Colorado, crosses the eastern boundary of Utah, and flows S.W. until it unites with the Green River. The Bear River rises in the N.E. part of Utah, and flows first N. into Idaho. Having returned into Utah territory, it pursues a S.W. course and enters Great Salt Lake. Sevier River rises in the S. central part of the territory, and terminates in Sevier Lake, which is about 39° N. lat. The Weber River is a small tributary of the Great Salt Lake. Its general direction is nearly N.W. None of these rivers are navigable.

Minerals.—Iron ore abounds in some places, and a lead mine has been opened near Minersville. It is stated that gold, silver, copper, zinc, large quantities of bituminous coal, sulphur, alum, borax, and petroleum have been discovered; but the mineral resources of this territory have not yet been developed, mining enterprises not being much encouraged by the leaders of the Mormons.

Climate.—The climate of the great plateau between the Rocky and Sierra Nevada mountains seems to partake of the characteristics of the great Tartar plains of Asia. According to Orson Pratt, the midsummer is dry and hot, the heat ranging at midday from 90° to 105°, but with cool mornings and evenings, refreshed with mountain breezes. The winters are mild, snow seldom falling more than a few inches deep in the valleys, nor does it lie long. Spring and autumn, though mild, are subject to sudden changes, and the wind is very variable, shifting, almost every day, to every point of the compass. Rain seldom falls between April and October, but when heavy showers do come they are generally accompanied by thunder and hail, and sometimes with strong winds. Dr. Bernhisel and Mr. Snow say that the climate of Great Salt Lake City, in lat. 40° 45′ N., is milder and drier than the same parallel on the Atlantic coast, and the temperature more uniform, the thermometer rarely descending to zero. During three years, according to observation, the highest point attained by the thermometer was 100° above, and the lowest 5° below zero. The variation between the temperature of day and night, in midsummer, is from 20° to 40°. Frosts in Utah valley occur as late as the last of May, and as early as the first of September.

Soil and Productions.—However wild their religious views, fantastic their ecclesiastical organization, and odious their polygamy, no colonists have ever been more successful than the Mormons, for they have converted a naturally barren land into a lovely region of cultivated fields, rich orchards, flower-filled gardens, and pleasant residences. Still but a very small portion, comparatively speaking, of Utah can ever be made available in producing food for man or beast. The fertile spots are found in the valleys watered by the pure streams flowing from the neighbouring mountains. The line of Mormon settlements occupies the valleys from N. to S., lying near the western base of the Wasatch range.

Bear, Great Salt Lake, Utah, South, Sevier, and Land Pitch valleys, are the principal agricultural districts. The upper portion of the valleys of the Green and Grand Rivers is represented as 'incapable of supporting any population whatever. The Uintah and Green River valleys, lying lower down on the tributaries of the Colorado, are, however, not so sterile.'

Wheat, rye, barley, buckwheat, Indian corn, and the garden vegetables of the middle states, are the products of Utah. There is a fine bunch-grass, which, owing to the dryness of the climate, does not decay, but furnishes fodder for the cattle during winter, without being made into hay in the ordinary way. The Indian corn and vines are liable to be blighted by early and late frosts. The experiments in rearing fruits have been attended with great success.

Timber is scarce throughout the territory, except on the mountains, and is principally composed of pine and fir trees. There are some groves of cottonwood and box-elder in the bottoms of the principal streams, and a scrub cedar also in some of the valleys. Wood, both for building and fuel, is scarce.

Animals.—This region is scarcely more fruitful in animal than vegetable life, but elk, deer, antelopes, grizzly bears, cougars, beavers, porcupines, mountain sheep, foxes, and wolves are found. Water-fowl are abundant in the lakes, and trout and very fine salmon in the mountain streams.

Manufactures.—Much progress in manufactures is hardly to be expected in a settlement so lately formed; but the more necessary implements of husbandry and housewifery, and the cheaper stuffs for clothing, are made in somewhat considerable quantities. The great distance and the cost of transport of supplies from abroad must perforce encourage home manufactures. The articles made are generally of a very superior description, many of the immigrants being skilled English artizans.

The trade of Utah is pretty much confined to traffic with the overland emigrants to California, and with the miners of Idaho, Nevada, Colorado, &c., who obtain here supplies of provisions and live stock.

Education.—The American spirit seems to pervade the people of Utah on the all-important subject of education. According to the census of 1860 the territory had 173 public schools, with 5485 pupils; two academies with 210 pupils; and ten public libraries with 5000 volumes.

Religion.—The Mormon Church is governed by a series of hierarchies, the highest of which is styled the First Presidency, composed of three persons, Brigham Young, Heber C. Kimball, and Daniel H. Wells. The next quorum in authority is the Twelve Apostles. The third quorum is the Seventies. The seventy members that constitute the first quorum of seventies are all presidents of the first ten quorums of seventies, making seven presidents to each quorum. The Mormons are required to give one-tenth of their property to the support of their religion. According to the census of 1860 there were in Utah twenty-one churches, and the value

of church property was 888,700 dollars. [MORMONS; MORMONISM.]

Utah is divided into seventeen counties; the capital is SALT LAKE CITY. The other principal places are *Provo City*, population in 1860, 2030, in 1865 about 3300; *Ogden City*, population 1464; *Brigham City*, population 975; *Farmington*, 591; *Manti*, 916; and *Parovan*, 526. These towns are chiefly built of adobes or sun-dried bricks, and are mostly situated near the base of the Wasatch mountains.

The population is principally composed of Mormons, who settled here in 1847, after their expulsion from Missouri and Illinois. At the census of 1860 there were 40,273 inhabitants, of whom 20,178 were males. The number has since more than doubled, as continual accessions to this new sect are constantly arriving from all parts of the United States and different countries of Europe, especially Great Britain. According to an enumeration made in 1853 by the Mormons themselves, the total population was only 18,206, exclusive of Indians, of whom there are several tribes in a very degraded state, subsisting mostly on roots, berries, fish, &c., and living generally in caves or bushes, but sometimes in wigwams or tents, and going nearly naked.

The governor and secretary are appointed by the president of the United States for a term of four years, but their commissions are at any time revocable by the appointing power. The other officers are chosen under territorial authority. The legislative power of the territory is vested in a legislative assembly, consisting of a Council and House of Representatives. The Council is composed of thirteen members, elected by the people of the territory for two years; and the house is constituted of twenty-six members, chosen in the same way for one year.

History.—The materials for a history of Utah are very meagre. It was a part of the territory of Upper California acquired from Mexico by the treaty of 1848, after the conclusion of the war with that country. Previous to 1847, when the Mormons commenced directing their steps thither, it had been in possession of the miserable tribes that gained a most precarious living from its churlish soil, undisturbed except by the occasional visits of exploring parties or roaming trappers and hunters. [MORMONS.] Utah was organized as a territory on the 9th of September, 1850. The name is derived from an Indian tribe, Yuta, or dwellers in the mountains.

(Much very interesting information with respect to Utah and the Mormons will be found in Mr. Hepworth Dixon's *New America*, London, 1867. See also Captain Burton's *City of the Saints.*)

UTILITARIANS, a sect of modern politicians, whose founder was Jeremy Bentham, and who compute the value of all institutions by reference to the great principle which he enunciated, 'the greatest happiness of the greatest number.' The opponents of this school taunt it with confining that happiness exclusively to the material and economic welfare of the multitude, and with studiously disregarding all higher considerations. But that such is not the aim of their doctrines is clearly shown by Mr. John Stuart Mill, in his 'Essay on Government,' and his 'Utilitarianism.' The term is, in fact, a nickname, and contains as little truth as do most nicknames. Every statesman who rises to the full height of his vocation, and has a clear sense of his duties and responsibilities, must take a utilitarian view of human affairs, and devote his efforts to the furtherance of all wise schemes of moral, social, and political reform.

UTOPIA (Gr. *οὐ*, 'not,' and *τοπος*, 'a place'), a term coined by Sir Thomas More, to designate an imaginary island, which he supposes to have been discovered by a companion of Amerigo Vespucci, and where he describes as existent an ideal commonwealth, with laws, manners, and social customs of absolute perfection. As it is without sin, it is without misery; and its government being immaculate, the highest happiness everywhere prevails. Such a state of things being imaginary, it has become customary to apply the word *Utopian* to all schemes of a desirable but chimerical character. Sir Thomas More's work, entitled 'De Optima Reipublicæ Statu, deque Nova Insula Utopia,' was first printed at Louvain in 1516. A second and more correct edition was issued in 1518. It was translated into English by Bishop Burnet. (Hallam, *Introduction to the Literary History of Europe*, part i. c. iv. 34.)

UTR, an oriental name for the celebrated attar, or essential oil of roses.

UTRECHT, one of the Dutch provinces lying between Holland, Gelderland, and the Zuider-Zee, has an area of 534 square miles, and a population, according to the census of 1864, of 170,291, rather more than a third of whom are Roman Catholics. In the northern and western parts, and on the banks of the Leck, the surface is level and low; between Utrecht and Amersfoort there are some slight elevations. The soil in the low parts is rich and fertile; in the more elevated tracts sandy, with here and there some thickets, extensive heaths, and peat moors. A great portion of these waste lands has been recently reclaimed. The province is drained by the Rhine and its branches, and by several canals. The air is pure and healthy; there is good fresh-water, and the country has many beautiful country seats. The natural productions are—the common domestic animals, poultry, fish, bees, wheat, barley, tobacco, buck-wheat, pulse, garden fruit, culinary vegetables, flax, and hemp. The manufactures are chiefly in the towns, and consist of carpets, woollen, cotton, silken, and linen fabrics: there are also breweries and distilleries, soap-boiling establishments, saw mills, copper and iron foundries, pottery and cement manufactories, and tile and brick kilns. The exports are—corn, cattle, swine, butter, cheese, some manufactured goods, bricks, and tiles. The roads in this province, which are remarkably smooth, are paved with clinker-bricks. All the heavy traffic is carried on by the canals or railroads to Rotterdam, Amsterdam, and Arnhem.

Utrecht, the capital of the province, is situated at the point of divergence of the Oude Rhyn and the Vecht, in 52° 5′ N. lat., 5° 7′ E. long., and has 59,000 inhabitants. The Rhine divides the city into two parts, and there are likewise two canals with thirty-six drawbridges. The site is dry and rather elevated, with a descent towards the river. The approaches to the city are very beautiful, especially that from Amsterdam, which consists of a broad avenue, bordered with rows of trees. Altogether the environs are very beautiful, being well-wooded, and covered with rich grassy meadows, fruitful orchards, and well-kept flower gardens. Many wealthy Dutch families reside in and near the town. The appearance of the city itself is antique, many of the houses being in the Gothic style. It was formerly strongly fortified, but the ramparts have been converted into public walks. There is a magnificent walk called the Maliebann, above a mile in length, planted with eight rows of lime trees. The cathedral was formerly a fine edifice, built about 720. In 1674 a hurricane destroyed the body of the building, and only the choir, transept,

and tower remain; the last is wholly detached from the other parts, leaving room for a wide street on the place once occupied by the nave. The only part of the building at present in use is the choir, fitted up in a plain manner for the Presbyterian service, though it has some fine monuments. The tower is 388 feet high; and from its summit in clear weather the eye may overlook nearly all the Netherlands. There are, a mint, and numerous churches and charitable institutions. The town-house is a handsome modern building. The university, founded in 1634, has faculties of languages, mathematics, medicine, theology, and law; attached to it are a good library, botanic garden, and an observatory. The number of students is generally about 500. In addition to the university there are some scientific societies, and a large number of admirable schools in the city, and education generally stands very high. The inhabitants manufacture woollen cloths, silk, lace, and needles, tobacco and cigars (in the royal cigar factory about 40,000 are made per day), salt, furniture, baskets, rope, and tin, copper, and silver. There are also some saw mills, iron foundries, and extensive printing establishments. In addition to its manufactures the town has a good trade in grain and cattle. It has excellent water communication, and is also the centre of several lines of railway, which radiate to all parts of the Netherlands. The town is the seat of the provincial government, and of civil and military superior courts. Utrecht was the birthplace of Adrian Floriszoon, tutor to Charles V., bishop of Utrecht, and afterwards Pope Adrian VI. In the audience-hall of the university, in 1579, was signed the act of confederation, declaring the Seven United Provinces independent of Spain; and in the British minister's house, now replaced by a barrack, the treaty of Utrecht was signed in 1713, which ended the war of the Spanish succession. For a short time, in 1807, the town was the residence of Louis Napoleon, king of Holland.

UTRERA, a town of Spain, province and 16 miles S.S.E. of Seville. Population 12,712, mostly agriculturists, who rear the most ferocious bulls in Andalusia, and produce corn, wine, oil, and fruit. It stands around a fortified inclosure, has a Moorish castle, and is important as a military post, being at the divergence of several cross roads. Its streets are wide, and kept clean by running streams; and here are some remarkable churches, various convents and hospitals, a town-hall, prison, cavalry barracks, and manufactures of soap, starch, and leather. In the vicinity are productive salt springs. The town, which had fallen into a state of decay, has recently shown symptoms of revival.

UTRICULARIA, a genus of plants belonging to the natural order *Lentibulariæ*. There are only three species described, and they are all inhabitants of Great Britain. *U. vulgaris*, Greater Bladderwort, or Hooded Milfoil, is not unfrequent in ditches and deep pools.

UTTOXETER. [Staffordshire.]

UVA URSI, the *Arctostaphylos uva ursi*, or Bear's berry, a small shrub, whose leaves have a strongly astringent flavour. Their decoction is sometimes used in certain diseases of the bladder and kidney.

UVA'RIA, a genus of plants of the natural family of *Anonaceæ*, so named from *uva*, 'grape,' its fruit growing in grape-like bunches. It is nearly allied to *Unona*. *U. zeylanica* is a rambling shrub, a native of Ceylon, with scarlet starry flowers, and eatable fruit. The species form trees or shrubs. They are natives chiefly of India and the Indian islands, with a few in Africa.

U'VULA (Lat. *uva*), is the small cylindrical body which hangs at the middle of the posterior margin of the soft palate. It is covered by a continuation of the mucous membrane of the palate, and contains in its interior some minute glands, and a muscle which has the power of elevating and shortening it.

UVULA'RIA, a small genus of the natural family of *Melanthaceæ*.

UWAROWITE, a transparent mineral, which occurs in small rhomboidal dodecahedrons of an emerald-green colour. It is said to be a species of semi-chrome garnet, but is distinguished from that mineral by its infusibility before the blow-pipe. Its hardness is 6·0. It was so named in honour of M. Uwarow, president of the Imperial Academy of St. Petersburg.

UWINS, THOMAS, R.A., an artist of some eminence, was born in Pentonville, London, in 1783. In early life he entered himself as a student at the Royal Academy, and afterwards practised almost exclusively in water colours. In 1811 he was elected a member of the Society of Painters in Water Colours. In 1826 he visited Italy; and painted many interesting scenes illustrative of the Italian peasantry, which acquired considerable popularity. Among other subjects may be mentioned his Neapolitan Peasantry returning from a Festa; Mountaineers returning from the Festa; Bay of Naples; Children asleep in a Vineyard, &c. He afterwards entered upon a loftier class of subjects, and painted Cupid and Psyche (for the late Prince Consort); John the Baptist proclaiming the Messiah, &c. In 1836 he was elected a Royal Academician; and from 1844 to 1855 was librarian to the Academy. In 1847 he was appointed keeper of the National Gallery. He died at Staines, in Middlesex, in 1857. In the Vernon Gallery, now at South Kensington, may be seen several characteristic and pleasing examples of his prolific pencil.

UXBRIDGE. [Middlesex.]

V, as pronounced by the English, is the pressed or medial labial aspirate, bearing the same relation to *f* that *b* does to *p*. Its form is only a variety of the character by which the vowel *U* is denoted, the latter being in its origin the cursive character employed with soft materials, while *V* is better adapted for writing on stone. The Roman letter V was probably pronounced as a *w*, a supposition which would explain the fact that in the alphabet of that language one character is employed for both *u* and *v*. The converse of this appears in the German alphabet, where *w* has nearly the power of *v*, while the latter symbol is used to designate the sound of the English *f*.

V is interchangeable with *b* and *m*. [See B and M.] It is also interchangeable with *f*, and hence the confusion between the characters *f*, *v*, and *w*. As a Roman numeral it stands for 5. For the changes with *w*, *gu*, *du*, see W.

VACCINA'CEÆ, a natural order of shrubby plants belonging to Lindley's polycarpous group of Monopetalous Exogens. They are common in Europe, and abundant in North America, extending to very high northern latitudes, and are not uncommon on high land in the Sandwich Islands.

The properties of this order closely resemble those of *Ericaceæ*. The bark and leaves of many of the species possess astringent properties, and are slightly tonic and stimulating. The fruit of many of the species possess acid and saccharine properties, and are used as articles of diet under the names of Cranberry, Bilberry, and Whortleberry.

VACCINATION, LAW OF. In 1841 the Vaccination Act was passed, which made the practice of inoculating with small-pox *virus* unlawful. In 1853 another Vaccination Act was passed, with the view of rendering the practice of vaccination compulsory. The Public Health Act, passed in 1858, gave to the privy council the power of issuing such regulations as they may think fit for securing the due qualification of persons to be contracted with for the vaccination of poor persons resident in unions and parishes, and for securing the efficient performance of vaccination. But all these Acts have been repealed by the 30 & 31 Vict. cap. 84, which came into operation on January 1, 1868. By this Act the guardians of every union or parish are required to divide the same into districts, and then to enter into a contract with some duly registered medical practitioner for the performance of vaccination of all persons resident within each district, the said practitioner to be called the public vaccinator of the district. In addition to the payment out of the poor rates, a further sum not exceeding one shilling for each child whom the vaccinator has successfully vaccinated may be paid out of moneys provided by Parliament. The fees paid by the guardians are not to be less than 1*s*. 6*d*. for each successful operation, if performed at the residence of the vaccinator or in the district workhouse; but if done at any station over 2 miles from his residence, not less than 3*s*. The guardians are to provide all stations at which the vaccination shall be appointed to be performed other than the surgery or residence of the public vaccinator. The registrar of births is to deliver notice of the days, hours, and places of public vaccination to every parent or other person registering the birth of a child, and the parent is compelled to have the child vaccinated within three months after its birth. On the same day in the week following that in which the operation was performed, the parent must again take the child to the vaccinator that he may inspect it, and ascertain the result of the operation; and if he see fit, take from such child lymph for the performance of other vaccinations. After every successful operation the practitioner is to transmit to the registrar of births in the district a certificate that the child has been successfully vaccinated, and to give a duplicate to the parent. If the operation is performed by a medical practitioner not being the public vaccinator, the parent is to procure the certificate, and to transmit a duplicate to the registrar. No fee is to be charged by the public vaccinator for any operation or certificate. The penalty for neglecting to procure the proper vaccination of a child, inspection after vaccination, or transmittance of certificate to registrar, is 20*s*. for each offence. Any person who produces, or attempts to produce, the disease of small-pox in any one by inoculation with variolous matter is liable to one month's imprisonment. The registrar of the national vaccine establishment is empowered by the Privy Council to supply lymph, guaranteed by the national Vaccine Board, to all medical practitioners who apply to him for it.

Vaccination from a medical point of view is described in the articles SMALL POX; JENNER, EDWARD.

VACCI'NIUM, a genus of plants, the type of the natural order *Vaccinaceæ*.

V. myrtillus, the common Bilberry or Bleaberry, is abundant in Great Britain, especially in the north, and in hilly districts of the south. The blossoms of this plant are elegant. It flowers in May, and its berries are ripe in the autumn. In the north of England and Scotland the berries are gathered and used for making tarts; in Devonshire they are eaten with clotted cream. *V. uliginosum*, Great Bilberry, or Bog Whortleberry, a native of Great Britain, is found in mountainous bogs in Cumberland and Westmoreland, but more frequently in the Highlands of Scotland, and nearly on the summits of the highest mountains. Its berries are very similar to those of the common whortleberry, but their flavour is not so agreeable. It is a native of Iceland, and the inhabitants gather its leaves, with those of *Lycopodium alpinum*, in order to procure a yellow dye for colouring woollens. *V. Vitis-idæa*, Red Whortleberry, or Cowberry, is a low straggling shrub, with leaves resembling those of the Box, and pale flesh-coloured flowers. It is a native of dry places on heaths, mountains, and in woods, throughout Europe. It is plentiful in the north of England, Westmoreland, Derbyshire, and Wales. The berries are red, and possess acid and astringent properties. They are hardly eatable in a raw state, but are

made into pies in Derbyshire, and eaten by the common people. *V. stamineum*, the Green-wooded American Whortleberry, has a trunk 2 feet high, giving out numerous green branches, which are downy while young. The flowers are white, with ten stamens, and are succeeded by greenish or white berries, called Dew-berries. It is a native of North America from New England to Florida. A variety is found in Mexico. It is a pretty garden shrub, and often cultivated. *V. corymbosum*, the Naked Flowering Whortleberry, is one of the largest of the species, attaining a height of 7 or 8 feet. *V. frondosum*, the Blunt-leaved Whortleberry, or Blue Tangles, is a native of America from New Jersey to Carolina, in open woods. *V. arctostaphylos*, Oriental Bearberry, or Bear's-grape Whortleberry, attains a height of 5 or 6 feet, and is a native of the coast of the Black Sea. *V. padifolium*, the Madeira Whortleberry, or Bird-cherry-leaved Bear's Grape, is found on the loftiest parts of the island of Madeira, where it forms impenetrable thickets. Pallas describes the berries as black, juicy, eatable and gratefully acid.

VACHELLIA, a genus of plants belonging to the natural order *Leguminosæ*. *V. Farnesiana* is a native of the East and West Indies and Africa. The bark exudes a considerable quantity of gum. The flowers when distilled yield a delicious perfume.

VA'CUUM, or VOID, the name given in physics to the idea of space wholly free of matter, or perfectly empty. In the common phrase, space is called empty when, so far as air can fill space, it is full of air; and even in a more scientific form of speech, there is said to be a vacuum when there is such an approach to a vacuum as the operations of philosophy can procure. Thus in the vacuum of the air pump, however long the attempt at exhaustion may be continued, there is always air left, though in a highly attenuated state; and even in the mercurial vacuum, or in the space which is left over the mercury of the barometer, there is not unfrequently a slight portion of air, and always an atmosphere of the vapour of mercury. Physically speaking, it is perhaps impossible to procure a vacuum: it is most likely that, even if a real vacuum could be procured for an instant, air or other vapour would at once begin to be disseminated from the sides of the vessel in which it was made, and that it would thus instantly cease to exist.

But the question of the existence of vacuum, in its strict and absolute sense, and as to whether it is or not, was a subject of controversy from the earliest days of philosophy.

Descartes denied the very possibility of a vacuum. There is in his writings an absolute and palpable confusion between *space* and *matter*, to the extent of an assertion that the destruction of all the matter in a certain space would be the destruction of the space itself.

Probably the manner in which the reader is most familiar with the use of the word is in connection with the maxim 'Nature abhors a vacuum;' a doctrine which, though common among the followers of Aristotle, must not, any more than many others, be taken as emanating from that philosopher himself. This is usually cited as a proof of the puerility of the ancient and middle philosophy —we think somewhat unjustly. The personification of Nature is common to all times, and we are in the habit of saying that Nature exhibits phenomena, conceals her operations, uses the simplest means, &c. Now Nature may as well abhor, as exhibit, conceal, or employ; and where intelligence is understood, all who use the word Nature mean the God of Nature: while when the mere operations are referred to, Nature is only the personification of the collective body of second causes. As the statement of a fact, it is *true:* Nature *does*, to the best of our knowledge, abhor a vacuum; *she* (if we may personify her) never suffers it to exist to the extent of allowing any space which is perceptible to our senses to be vacuous. But if the adage were meant to supply a reason for the fact, those who used it were deceiving themselves, but not so that the most of those who would laugh at them would have any reason in their mirth. It is the error of every period to use words expressive of a fact observed in the sense of assignment of a reason for that fact; and the era which has always been ready with its *fluids* to stand for the causes of heat, electricity, magnetism, &c., should not be too hard upon the preceding ages, which put the feelings of nature in the place which it prefers to occupy by hypothetical gases.

VADE MECUM (Lat. 'go with me'), a phrase commonly applied to any portable book or manual easily carried about the person.

VAGABOND. [VAGRANT.]

VAGRANT. This term, which simply denotes 'a wandering person,' is derived from the Latin *vagor*. It was probably introduced into our law language from the Norman-French. Modern laws have given to the word 'vagrant' an extended meaning, in the application of which the notion of wandering is entirely lost.

In England various statutes and ordinances have been passed to obviate the inconveniences arising from wandering mendicancy. These statutes were very numerous from the 23 Edward III. (1349) to the end of the reign of Henry VIII. But notwithstanding these laws, vagrancy appears to have greatly increased at the beginning of the reign of Edward VI.

A short time after the accession of Elizabeth, a description of persons called *rogues* first appear in the general class of vagrants. In this reign the evils of vagrancy increased very much, to remedy which the statute 39 Eliz. c. 3 was passed, which made those provisions for the legal relief of the poor which a few years afterwards were completed by the statute 43 Eliz. c. 2. The same committee also recommended measures for encouraging the building of 'hospitals, or abiding and working houses' for the poor, and for improving and reforming such as were already in existence, but had been misapplied or abused. And at the same time they introduced a more rational enactment for the correction and suppression of fraudulent vagrancy. (39 Eliz. c. 4.)

The laws relating to vagrants continued substantially upon the footing of the statutes of 39 Eliz. and a subsequent statute, 7 Jac. I., for more than a century, until, in 1744, they were reconsidered and remodelled by the statute 17 Geo. II. c. 5. This was the first legislative measure which distributed vagrants into the three classes of idle and disorderly persons, rogues and vagabonds, and incorrigible rogues. The present law as to vagrants is contained in the 5 Geo. IV. c. 83. This Act was amended by the 1 Vict. c. 38 (1838), and by 7 & 8 Vict. c. 101, and 8 & 9 Vict. c. 10. The third section of the statute 5 Geo. IV. declares what persons are idle and disorderly persons, and may be committed by a single magistrate to hard labour in the house of correction for any time not exceeding one month.

Although the modern statute is in many respects an improvement of the law, it is liable to some of the objections which were made to the 17 Geo. II. c. 5, and to others of a graver character. It is by no means exclusively a Vagrant Act; its provisions extend to various offences not necessarily connected with vagrancy. Under the former statute, a single magistrate had only

the power of summary commitment for a month in the case of idle and disorderly persons, or to the next sessions in case of rogues and vagabonds and incorrigible rogues. But, under the recent Act, a single magistrate has the power of committing rogues and vagabonds to prison with hard labour for three months. If the offences to be punished had been precisely defined by the statute, this extensive summary jurisdiction might have been less objectionable; but the language of the law is very loose. For instance, who are to be considered 'suspected persons,' or 'reputed thieves;' or what is to be taken for an 'unlawful purpose,' or 'frequenting a street,' are often questions of difficulty to practical lawyers, and may occasion hesitation and differences of opinion even among those to whom the final interpretation of penal laws belongs. This vagueness of expression is peculiarly dangerous in a law which gives large judicial power to unprofessional persons, who are for the most part withdrawn from the control of public opinion in the exercise of it; where the subjects and objects of the law are nearly connected with local excitements and prepossessions; and where the parties who suffer from misdecision are commonly the poor and helpless, to whom an appeal is wholly inaccessible.

The above cited Acts do not extend to Scotland. There are there several old statutes against gipsies (termed Egyptians) and masterful and sturdy beggars, and against harbouring such—1445, c. 45; 1477, c. 77; 1567, c. 21; 1579, c. 74; 1661, c. 38. The Trespass Act, 17 & 18 Vict. c. 91 (1854), makes it an offence to pitch tents or to lodge in houses or lands without consent of the owner. It would be difficult to apply the English Vagrant Act to Scotland, seeing that by the poor law of the latter country no able-bodied person, though out of employment, can demand or receive aid from the assessment.

VA'HEA, a genus of plants of the natural family of *Apocynaceæ*, so named from *Vahé*, the name of one of the species, *V. gummifera*, in the island of Madagascar, where it is said to yield an excellent kind of caoutchouc. The natives call it *Voua-héré*.

VA'HLIA, a genus of plants of the natural order of *Saxifrageæ*. Though it belongs to a family of plants indigenous in cold and temperate climates, it is itself found only in hot parts of the world, as Egypt, Senegambia, the Cape of Good Hope, and the peninsula of India.

VAILLANT, FRANCOIS LE, was born in 1753, at Paramaribo, in Dutch Guiana, where his father was French consul. In 1765 his family returned to Europe and settled at Metz. Here Le Vaillant, who had from a very early age collected objects of natural history, and arranged them on a system of his own, found a fresh stimulus to his favourite pursuits in the ornithological cabinet of M. Bécœur. These pursuits were in him the indulgence of a passion, and when in 1777 he went to Paris, he became dissatisfied with his situation, and formed the project of investigating the yet unexplored regions of the earth in search of new varieties of birds. With this object he quitted the capital, unknown to his friends, in July, 1780, repaired to Amsterdam, and embarked in December for the Cape of Good Hope, where he arrived in March, 1781.

Le Vaillant remained in the colony till July, 1784, and returned to Paris in 1785. During the time he was at the Cape he made two exploring excursions: the first lasted from December, 1781, to April, 1782, proceeding from Cape Town westward to the Great Fish River, which he traced upwards to about the spot where Beaufort now stands, and to some distance within the country of the Caffres. His second excursion, begun in April, 1783, extended over sixteen months, when he advanced northward beyond the Orange River, but how far is uncertain.

The narrative of his first expedition was published in 1790. In 1796 the second part of his Travels appeared. The first volume of the 'Natural History of the Birds of Africa' was published the same year; it was followed at intervals by four others; the sixth appeared in 1812; and Le Vaillant at his death left two additional volumes in MS. The 'Natural History of Parrots,' in 2 vols., was published 1801-5; 'The Natural History of Birds of Paradise,' 1801-6; 'The Natural History of Cotingas,' 1804; 'The Natural History of Calaos,' 1804. Le Vaillant died in retirement near Lauzun, November 22, 1824, having been saved from the guillotine thirty years before only by the timely death of Robespierre.

VAISON. [VAUCLUSE.]

VALAI'S (*Wallis*), a Swiss canton, consists of the basin of the Rhone from the source of that river to the Lake of Geneva. A small portion of this basin, however, which lies on the right bank of the river between the Dent-de-Morcles and the lake, belongs to Vaud. The canton has been described as an immense trough, 70 miles in length, 1½ mile in depth, and 2 miles wide at the bottom. The mountains on either side—the Pennine and Bernese Alps—are amongst the highest in Europe, and the canton is exposed to furious torrents and destructive avalanches.

Physical Aspect, Products, &c.—The area is about 2000 square miles, of which more than one-half consists of high alps and glaciers, and the remainder of lower offsets and intermediate valleys. The heat in the summer is very great in the valley, especially in the neighbourhood of Sion and Sierre, where the fig, mulberry, almond, and pomegranate, thrive in the open air. The vine, Indian corn, barley, and potatoes, are cultivated. Walnut, chestnut, cherry, apple, and pear trees, are abundant. In several localities excellent wine, both white and red, is made, and cider in other districts. Cattle rearing is the chief branch of industry, but in ordinary years the crop of corn is sufficient for the consumption. The forests are extensive: great quantities of timber are cut down, and sent by the Rhone into France. The horned cattle, sheep, and goats, are numerous; horses and mules are not so. Mines of iron, copper, lead, silver, cobalt, and zinc, have been found. There is little manufacturing industry in the country, and the population, generally, is much poorer than that of the Bernese Oberland. There is a somewhat active transit trade, as the Valais opens into the Lake of Geneva, and is also connected by great high roads and a railway with other parts of French Switzerland. The sublime pass of Gemmi connects the eastern part of the valley with German Switzerland, and the GREAT ST. BERNARD and Simplon with Italy. The inhabitants of the *Bas-Valais* are chiefly of French, and those of the *Haut-Valais* of German descent, and their language varies accordingly. Their number in 1860 was 90,880—all Roman Catholics.

Divisions, Chief Towns, &c.—The canton is divided into districts called dizains, each of which sends four deputies to the local diet. The deputies are elected by all the male inhabitants over eighteen years of age. In respect to education the Valais is behind most other parts of Switzerland. Goître and cretinism are also more prevalent than elsewhere.

The principal towns of the Valais are the following:—

Sion, or *Sitten*, an old-looking place, surrounded with turreted walls and a ditch, in a picturesque situation at the foot of two rocky hills, on the right bank of the Rhone, 18 miles N.E. of Martigny by the Simplon Railway, of which it is the terminus. It gives title to a bishop, and has a large cathedral, a fine old Gothic town-house, a college, a curious old tower said to have been raised by Charlemagne, two ruinous castles on the summit of the two hills, an hospital, an arsenal, and about 3000 inhabitants, who manufacture an excellent wine, called Malvoise. *Leukerbad*, a village and bathing place, 23 miles E.N.E. of Sion, is nearly 5000 feet above the sea. The springs have a high temperature—one of them 144°—are slightly saline, chalybeate, and sulphurous, and are used both for drinking and bathing. They are chiefly useful in skin diseases, for the cure of which patients often remain in the water eight hours at a time. The bathing houses are thronged during the summer, but closed altogether in winter. *Sierre*, or *Siders*, 10 miles E. of Sion, is a large village in a beautiful and fertile country: it has some fine houses, belonging to the wealthiest families of the Valais. There is an old turreted castle in the neighbourhood. *Brieg*, in the Upper Valais, a handsome village near the foot of the Simplon, has a college and church with a library, a convent of nuns, and some other good buildings. *Martigny*, the chief town of the Lower Valais, built on the site of the ancient Octodurum, 24 miles S.S.E. of the Lake of Geneva, has several good buildings, inns, and shops, and about 1200 inhabitants. The high roads over the Simplon and the St. Bernard pass through Martigny, and it is consequently a great resort for tourists. It contains a monastery, from the inmates of which those for the Mont St. Bernard monastery are recruited. *St. Maurice*, a small town of 1300 inhabitants, on the left of the Rhone, 10 miles below Martigny, is remarkable for its Augustinian abbey, annexed to which is a college, and a valuable library. *Zermatt*, a hamlet of clean wooden houses, with a neat church, in the upper extremity of the valley of St. Nicholas, is a principal station with alpine climbers. It is 5400 feet above the sea, and is in one of the grandest situations in the world, lying at the junction of three valleys, each with its characteristic glacier, and overlooked by Monte Rosa on one side and the Matterhorn on the other.

Valais holds the twentieth place in the Swiss Confederation. Under the French it formed the department of the Simplon. The hospice of St. Bernard is in the canton. [BERNARD, ST.]

VALDENSES. [VAUDOIS.]

VALDIVIA. [CHILI.]

VALENCAY. [INDRE.]

VALE'NCIA, a province of Spain, is bounded E. by the Mediterranean, S. by Murcia, Alicante, and Albacete; W. by Albacete and Cuença, N.W. by Teruel and the Sierra de Albarracin, and N. by Castellon. Until the year 1832 Valencia was called a kingdom, having once formed part of the dominions of the crown of Arragon; but it was then divided into three provinces, Valencia, Castellon de la Plana, and Alicante. A large proportion of the surface, particularly in the north and west, is mountainous, but the plain country, which stretches along the coast, and is well watered by the rivers Xucar, Guadalaviar, and Segura, is one of the most fertile and best-cultivated districts in Europe. The plain or vega of Valencia is about 30 miles long and 20 wide: on three sides it is bounded by the mountains of Segura, and on the fourth by the sea. The whole of this vast extent is known as the *Huerta*, or Garden of Valencia, and is planted with olive, mulberry, ilex, algaroba, orange, and palm trees. Such is the fertility of the soil that two and three crops are generally obtained in the year. Rice is the most valuable product, and is chiefly grown in the tract which is irrigated by the Albufera, a large lake in the neighbourhood of Valencia. [ALBUFERA.] The yield of rice is not only sufficient to supply the province, where it is consumed in large quantities, and the whole of the rest of Spain, but also to allow of a considerable quantity being exported. The other chief product is the white mulberry, for the feeding of silk-worms; the produce of silk amounts to above one million of pounds yearly, a great part of which is sent in its raw state to France. The export of fruit from Valencia is also considerable; of raisins the quantity exported has in some years been upwards of 150,000 cwts. to England alone. The exports of barilla, almonds, figs, oranges, oil, saffron, wool, brandy, and wine, from different ports of Valencia is also very great, particularly the wine called Beni Carlo, which comes from a town of that name. Much of this wine is sent to Bordeaux to impart body and colour to the clarets.

No great number of cattle or horses are kept; and the sheep, though numerous, yield wool of indifferent quality. The lagoons on the coast are rich in sea-fowl and fish. Mercury, copper, sulphur, arsenic, gold, silver, lead, iron, coal, and antimony, are among the mineral products. Woollen, linen, and silken goods are made in several towns of the province, but chiefly for home consumption. Cordage made from the fibre of the esparto grass, mats, flooring tiles, soap, glass, paper, pottery, and earthenware, are sent to all parts of Spain. Salt is also largely exported.

The area of the kingdom of Valencia in 1832 was 7651 square miles, and the population 957,104. The area of the present province is 4352 square miles, and the population, in 1864, was 647,286. The dialect spoken, though much akin to the Catalonian, differs considerably from it, as it retains more of the Provençal. The inhabitants, who are chiefly of Moorish descent, are more industrious than those of any other part of Spain, except Catalonia. Valencia was first colonized by the Phœnicians or Carthaginians, who had established many flourishing settlements in it, when it was wrested from them by the Romans. Under the latter it made great progress in civilization, and was one of the most tranquil provinces of the empire, when it fell a prey to the Goths. About the beginning of the eighth century the Saracens became its masters. In the eleventh century it was erected into a separate Moorish kingdom, under the dynasty of the Ahmerides, and retained its independence till 1238, when Don Jayme I., availing himself of its civil dissensions, completely subdued it, and incorporated it with his own kingdom of Arragon. It afterwards passed to the crown of Castile, but continued to preserve its representative body and its privileges till the early part of the eighteenth century, when, having taken part against the Bourbon dynasty, it was, on their establishment on the throne, deprived of its old constitution, and obliged to conform to the laws of Castile.

VALENCIA *de Alcantara*. [ESTREMADURA, *Spanish*.]

VALENCIA DEL CID, a city of Spain, capital of the province of Valencia, 194 miles E.S.E. from Madrid by railway, in 39° 28′ N. lat., 0° 24′ W. long., stands in a wide plain called *La Huerta*, or 'the Garden,' about 4 miles from the mouth of the Guadalaviar, which washes its walls and separates it from its suburbs. with

which it communicates by five stone bridges of from ten to thirteen arches. Valencia was a city of some importance under the Romans. The Moors captured it in 712, and the town was annexed to the empire of Cordova till about 1056, when, for a short time, it and its dependent territories formed an independent kingdom. It was taken after several months' siege, about 1088, by the famous Cid Rodrigo Diaz de Bivar, from whom the city takes its surname *del Cid*. The Moors, however, soon compelled the Cid to evacuate the town, of which they remained masters till September 29, 1238, when it was finally taken from them by Jayme I. of Arragon. Valencia was captured by the French under Suchet in 1812, and held by them till June, 1813.

The city is nearly circular, and about 2½ miles round: it is inclosed by massive walls built by the Moors, flanked at intervals by round towers. There are eight gates; that of the Cid is very remarkable for its architecture. The older streets are narrow and crooked, and the houses being built very close together, have a somewhat gloomy appearance, but on this very account they are admirably adapted to keep out the heat. Looking down from the cathedral on this part of the city the streets can scarcely be seen at all, in consequence of the irregular, close-packed roofs. The new thoroughfares are wide and well paved, and the houses lofty and painted with such colours as offer the least attraction to the rays of the sun. The best of them have courts freshened with flowers and cooled by fountains. The city is furnished with public sewers of great solidity, which are said to be the work of the Romans. The cathedral, built on the site of a temple of Diana and a Moorish mosque, is of mixed architecture, with a very lofty tower called 'el Miquelete,' from the top of which a commanding view of the whole Huerta is obtained. In fact, the view is generally admitted to be the finest in Spain. The cathedral contains numerous richly-decorated altars, and paintings by Valencian artists. The church of the Colegio de Corpus and some picture galleries also contain several excellent specimens of the great Valencian school. The exchange, a palace built by Charles III., the archbishop's palace, the college of Pius V., and several noble residences, are worthy of notice. There are also a theatre and various hospitals, and altogether about twenty churches, but none of them of any architectural importance. The university, founded in 1411, is one of the most frequented in Spain; it was formerly famous for the study of medicine. The magnificent library attached to it was entirely burnt by the explosion of a shell during the Peninsular war: another library has since been formed with the books of the suppressed convents, as well as a gallery of paintings and sculpture, collected from the various religious houses in the province. Besides the university there are at Valencia six colleges and many inferior academies. The city is the see of an archbishop, the residence of a captain-general, and has a supreme court of justice.

Valencia has very good facilities for bathing, and being now in direct railway communication with the capital, is visited by large numbers of Madrilenos during the summer months. The climate, though hot, is agreeable and healthy. The city has good quays, faced with stone, and lined with trees. The port of Valencia is at Grao, about 2 miles farther down the Guadalaviar. It is connected with the city by a broad planted avenue, which is a favourite promenade with the inhabitants. From the sea the city has quite an oriental appearance, in consequence of the number of domed churches and campaniles. The harbour was formerly suitable only for boats, but it has recently been much improved, and can now afford accommodation and shelter to vessels drawing 17 feet of water. The imports are codfish, bricks, iron, coals, tobacco, colonial produce, hides, manufactured goods, linen, hardware, trinkets, Norway deals, and Dutch cheese. The exports are barilla, wine, raisins, almonds, lead, brandy, oranges, raw silk, saffron, oil, wool, mats and ropes, salt, liquorice, and aniseed. The number of English vessels which annually enters the port is about 130; the imports from Great Britain averaging 130,000*l*., and the exports thereto 60,000*l*. a year. The export of oranges to the United Kingdom, which only commenced a few years since, increased from 6000 cases in 1856 to 240,000 cases in 1867, upwards of fifty steamers being now engaged in the trade. The vicinity of Valencia presents the appearance of a vast garden or orchard; and the inhabitants are chiefly devoted to agriculture, although many branches of trade flourish in the city, which has altogether very much improved of late years. Velvets, taffetas, flowered damask, and other silk stuffs are extensively manufactured. Woollens, camlets, hats, table linen, gauzes, artificial flowers, pottery and earthenware, tiles for flooring, glass, and paper, are also made. A custom-house erected in the middle of the eighteenth century is now used as a cigar manufactory, employing over 3000 females. In addition to the railway to Madrid there is a line to Tarragona, and thence to Barcelona. The population of the city and suburbs is 145,000; of the city alone 90,000.

VALENCIENNES. [NORD.]

VALENS, FLA'VIUS, Emperor of Constantinople, reigned from 364 to 378. He was a brother of VALENTINIAN, FLAVIUS, who, after being proclaimed emperor in 364, made him his colleague, and gave to him the government of the Eastern empire, and Constantinople as his capital. Three years afterwards he was engaged in war with the Goths, who in 369 sued for peace. In 375 his brother Valentinian died, and Valens was deprived of a wise adviser at a time when he was most in need of him. In the year following the Huns entered Europe from Asia, and after having subdued the Aláni, pressed upon the Goths north of the Danube, some of whom were likewise subdued. About 200,000 Visigoths fled to the Roman territory as suppliants, and obtained permission to settle in it. The Goths being soon dissatisfied with their new quarters, took up arms under Fritigern, and defeated the Romans, while Valens was residing at Antioch to watch the movements of the Persians. As the Goths still resisted the Roman commanders, Valens marched against them from Syria with an army of veterans. A decisive battle was fought near Adrianople in 378, in which the Roman army was cut to pieces, and the emperor was burnt in his tent, to which he had been carried wounded from the battle.

VALENTIA, a stuff made of worsted, cotton, and silk, used mostly for waistcoats.

VALENTIA. [KERRY.]

VALENTINE'S DAY, the 14th day of February, so called because marked in the calendar as the feast of St. Valentine, a Romish priest, who was martyred about 270. Antiquarians are not agreed why the custom of choosing lads and lasses as Valentines should have been attached to this particular day. Mr. Douce's explanation seems the most judicious. It was the custom, he says, in ancient Rome, during a great part of the month of February, to celebrate the Lupercalia, which were feasts in honour of Pan and Juno, whence the latter deity was named Februata, Februalis, and Februlia. On this

occasion, amidst a variety of ceremonies, the names of young women were put into a box, from which they were drawn by the men as chance directed. The pastors of the early Christian church, who by every possible means endeavoured to eradicate the vestiges of pagan superstitions, and chiefly by some commutations of their forms, substituted, in the present instance, the names of particular saints instead of those of women; and as the festival of the Lupercalia had commenced about the middle of February, they appear to have chosen St. Valentine's day for celebrating the new feast, because it occurred at nearly the same time. It should seem, however, that it was utterly impossible to extirpate altogether any festival to which the common people had been much accustomed; and, accordingly, the outline of the ancient ceremonies was preserved, but modified by some adaptation to the Christian system. It is reasonable to suppose that the above practice of choosing mates would gradually become reciprocal in the sexes; and that all persons so chosen would be called Valentines, from the day on which the ceremony took place.

In the olden times Valentine's day was a great popular festival. On the previous evening a coterie of young unmarried folk would assemble and inscribe upon little billets the names of an equal number of maids and bachelors. These would be mixed together in a common receptacle, and drawn lottery-wise; the person so chosen, due regard being had to sex, would be the drawer's Valentine. It was customary to exchange presents between the parties thus connected by chance, but latterly the ladies were exempted from the obligation. In Charles II.'s reign married persons, as well as single, could play 'at Valentines.' A passage in Mr. Pepys' Diary throws a vivid light on the old customs. 'This morning,' he says, 'came up to my wife's bedside, I being up dressing myself, little Will Mercer, to be her Valentine, and brought her name, written upon blue paper, in gold letters, done by himself, very pretty; and we were both well pleased with it. But I am also this year my wife's Valentine, and it will cost me 5*l*. I find that Mrs. Pierce's little girl is my Valentine, she having drawn me; which I was not sorry for, it easing me of something more that I must have given to others. But here I do first observe the fashion of drawing of mottoes as well as names; so that Pierce, who drew my wife, did also draw a motto, and this girl drew another for me. What mine was I forget; but my wife's was "Most courteous and most fair," which, as it may be used, or as an anagram upon each name, might be very pretty.' It is scarcely necessary to add that Valentine's day is no longer observed, except by the transmission of those coloured and ornamented missives popularly known as Valentines, which greatly augment the postman's burden on every 14th of February.

VALENTINIAN I., FLA'VIUS, a Roman emperor, reigned from 364 to 375. He was a native of Cibalis in Pannonia. He distinguished himself as a soldier in various campaigns. His mind was uncorrupted by the sophistries of the age, and his body was strong and healthy. After the death of Jovian, in 364, Valentinian was proclaimed emperor at Nicæa; but he divided the empire with his brother Valens, reserving for himself the western portion. [VALENS.] The frontiers of the empire were exposed to great danger during his reign. Valentinian chose Paris as the centre of his operations against the barbarians, and through his general, Jovinus, he gained a victory over the Alemanni in 366. In 368 the Alemanni renewed their attacks upon eastern Gaul, and plundered Maïnz; but Valentinian drove them back, and took up his residence at Treves. He continued the war successfully against the Germans, and celebrated a splendid triumph. Theodosius, the father of the future emperor, who had recovered Britain, was sent in 372 to oppose the rebel Firmus, who in 373 committed suicide. The Quadi and Sármatæ now invaded Pannonia, and Valentinian, quitting his residence at Treves, drove them back across the Danube. The barbarians sent to the emperor to ask for pardon, and in the audience which he granted them at Bregetio he fell into such a passion that he broke a bloodvessel, and died in 375.

VALENTINIAN II., FLA'VIUS, was a son of Valentinian I. by his wife Justina, and was only four years old when his father died. Gratian, who had been raised to the rank of Augustus in 367, succeeded Valentinian I. in 375, and made his brother Valentinian his colleague in the empire, assigning to him the præfecture of Italy and the western part of Illyricum. The education of Valentinian was left to his mother, who brought him up as an Arian, which led to violent disputes between the imperial family and Ambrose, archbishop of Milan. The religious commotion in Italy induced Maximus, who, after the death of Gratian in 383, had become master of Gaul, Spain, and Britain, to aspire to the possession of the whole empire. He invaded Italy, and Justina and her son fled for refuge to Theodosius, the emperor of the East. Valentinian was restored to his throne in 389 by Theodosius. After the death of his mother he abandoned his Arian heresies, which put an end to the religious quarrels. In 392 Arbogastes, who was now aiming at the sovereignty of the West, induced the emperor to go to Vienne in Gaul. After a quarrel with Arbogastes, Valentinian was found strangled in his apartment, May, 392.

VALENTINIAN III., PLACI'DIUS, a Roman emperor, son of Constantius, by Galla Placidia. In 425, when he was only a boy of six years, his uncle, Theodosius II., raised him to the rank of Augustus, and assigned to him the western portion of the empire, which his mother Placidia was to govern in his name, though she was ill-fitted for such a task. Gaul was constantly invaded by fresh hosts of barbarians, but Aëtius compelled them to sue for peace. Africa, where Bonifacius had the command, was lost, and fell into the hands of Genseric, king of the Vandals. In 437 Valentinian went to Constantinople, and married Eudoxia, the daughter of Theodosius II. and Eudŏcia. After the death of Theodosius II., in whose reign the Eastern empire had been ravaged and ransacked by the Huns, Attila, their king, invaded Gaul. But in 451 the Huns were defeated in the plains of Châlons by Aëtius, and driven across the Rhine. In the year following they invaded Italy, and as Aëtius had not sufficient troops to meet them, their forbearance was purchased by great sacrifices. The greatness of Aëtius had long nourished the jealousy of Valentinian, who in 454 slew him with his own hand. The worthless tyrant was himself assassinated in the following year.

VALENTINIANS, a religious sect which flourished in the second century. They were a branch of the Gnostics, and founded by Valentinus.

VALERIAN. [VALERIANA.]

VALERIA'NA, a genus of plants, the type of the natural order *Valerianaceæ*. The species are herbs or undershrubs, and are found in abundance in many districts both of the Old and New World.

V. officinalis, the Officinal or Great Wild Valerian, is a native of Europe, and by the sides of rivers and in ditches and moist woods is abundant in Great Britain.

The root has a very strong smell, which is dependent on a volatile oil. It is very attractive to cats, and also to rats, and is employed by rat-catchers to decoy them. It is used also in medicine at the present day as a stimulant. The root, or more properly the rhizoma, with its root-fibres, of this species, particularly the variety termed *V. sylvestris*, is used in medicine. The medicinal action is chiefly due to the volatile oil and extractive. In the slighter forms of nervous diseases not dependent on any change of structure of the brain or spinal chord, valerian is of considerable utility. In several instances, especially if there be much acidity of stomach, its beneficial effects are increased by combination with ammonia. In other instances valerian (in powder) greatly heightens the tonic power of the disulphate of quinia, the absence of all aroma from which renders it inferior as a tonic to many of the other forms of administering bark.

V. rubra, the Red Valerian, is indigenous to the south of Europe, the Levant, the north of Africa, and Mount Vesuvius. It is found occasionally wild in England; but as it is a very commonly cultivated plant, there is no reason to suppose that it is anything more than an outcast of gardens.

V. dioica, the Small Marsh Valerian, is abundant in some parts of Great Britain. Its roots are often substituted for those of the *V. officinalis*, but they possess little medical value. *V. Pyrenaica*, the Pyrenean or Heart-leaved Valerian, is a native of the Pyrenees, but has been largely cultivated in British gardens. *V. Phu*, the Garden Valerian, is a native of Europe, in Belgium, Alsatia, Switzerland, Silesia, &c. It has a thick, matted, pale-green root. The flowers are white, and give out a pleasant smell. *V. Celtica*, Celtic Nard, or Nard Valerian, is found in France, Italy, Illyria, and Switzerland, in alpine districts. Its roots are sweet-scented. *V. Hardwickii*, Hardwick's Valerian, belongs to Nepaul. It attains a height of about 3 feet. The root has a strong scent like the common Valerian, and is used by the Hindus in medicine.

VALERIANA'CEÆ, a natural order of plants belonging to Lindley's aggregose group of Monopetalous Exogens. It is composed of annual or perennial herbs or undershrubs. The species are natives of temperate climates or elevated positions in both the Old and New World. They are more abundant in the north of Asia, Europe, and South America, than in Africa or North America.

VALERIANELLA, a genus of plants belonging to the natural order *Valerianaceæ*, includes about twenty-five species. *V. olitoria*, common Corn-salad, or Lamb's Lettuce, is an annual, from 4 inches to a foot high. It is a native of Europe, in corn-fields and cultivated ground, and is found abundantly in such situations, especially in a light soil in Great Britain. In France and Germany it is much eaten as a salad, and is frequently cultivated for that purpose in this country.

The other British species of the genus are *V. dentata*, Smooth Narrow-fruited Corn-salad; *V. mixta*, Sharp Rough-fruited Corn-salad; *V. eriocarpa*, Blunt Rough-fruited Corn-salad. All the species are innocuous, and may be eaten as salads.

VALERIANIC ACID, an acid obtained from valerian root, forms two hydrates, by combining with different proportions of water. One of these, the *Monohydrate*, is oleaginous, very fluid, of an acid penetrating odour, like the valerian root; its taste is acrid and sharp, with a sweetish after-taste; produces a white spot on the tongue.

Valerianic acid combines with bases to form salts, which are called *Valerianates*. The potash salts are very soluble, deliquescent, and cryst difficulty. The valerianates of lime and bary very soluble, but they are crystallizable and in the air; the magnesian salt crystallizes in needles. The formula of this acid is C_{10} H boils at 347°.

VALERIA'NUS, PU'BLIUS LICI'NIUS, emperor, who reigned from 253 till 260, wa by birth, and descended of a noble family. when Gallus was murdered by Æmilianus, Val had the command of the legions in Gaul and hastened to Italy; but Æmilianus was put t his own soldiers before the arrival of Valerian immediately proclaimed emperor. Valerian, now at least sixty years of age, appointe Gallienus his colleague in the empire; but unfortunate choice. Though Valerian was good character, wise, and experienced, his a series of calamities. While the empire wa by the Goths on the side of the Danube, Sap of Persia, disturbed the eastern provinces. marched against the Persians, regained pos Antioch, which had been taken by the enemy, them across the Euphrates. But the Rom afterwards defeated near Edessa, and the em treacherously delivered up to Sapor in 260. in captivity, after suffering the greatest indign the early part of his reign Valerian was tolera Christians, but in the latter part he persecute

VALEROLE, an oil contained in the e valerian. It is isomeric with metacetone.

VALERY, ST. [SOMME.]

VALET (French; formerly written *varle vallet*, &c.), a waiting servant who attends on man. Formerly valets were the sons of kni afterwards those of the nobility, before they the age of chivalry.

VALETTA, LA. [MALTA.]

VALHALLA or WALHALLA, the Sca Olympus, the celestial locality in which Odi Ædris dwell with warriors who have died in ba latter are conducted thither after death by the Valkyries.

VALLADOLI'D, ancient *Pintia*, the capi Spanish province of Valladolid, 100 miles Madrid, on the railway to Burgos, stands in 4 lat., 4° 42′ W. long., in a plain bordered by hills, at the confluence of the Pisuerga and the and has 43,000 inhabitants. It is more than above the sea, and although occasionally subje winds, the air is generally pure and genial climate healthy. The city, which was for a the capital of the whole country, and the re several Spanish kings, is full of sumptuous e palaces, which, though now untenanted and son falling to ruin, give it a very imposing asp Plaça Mayor, or great square, and the stree to it, were formerly the only parts of the presented any animation; the rest looking and deserted. During the last fifteen years, the trade and prosperity of Valladolid have revived; new houses are being built, and t paved and widened. The cathedral, a spl unfinished edifice, was built by Juan de Herr church and convent of the Benedictines, th Gregorio and Las Huelgas, are very handsom college of San Pablo is the most remarkable the town, from its general elegance and the

finish of the bas-reliefs on its façade. This college, and the convent of San Gregorio, are amongst the finest Gothic religious edifices in the world. The royal palace is also a very fine building of mixed architecture, but, like the two preceding, it suffered much during the Peninsular war. The *cancilleria real*, in which the High Court of Appeal for the two Castiles and the Basque Provinces sits, is a fine structure in the Tuscan order. There are also a well-frequented university, founded in 1346, which was at one time celebrated for its school of jurisprudence; eight colleges; an academy of the fine arts, which possesses a fine collection of models in sculpture, architecture, and painting; and a museum of painting and sculpture, formed of the works found in suppressed religious houses.

Valladolid was formerly an opulent commercial city; and its manufactures of woollen stuffs, silks, cotton, jewellery, hats, paper, and perfumery, are still of importance. Trade has considerably increased since the opening of the canal between the Pisuerga and the Duero, and the railway from Burgos to Madrid. The neighbourhood is exceedingly fertile, and produces good white wine, madder, silk, olives, and corn. The town gives title to a bishop, and is the residence of a captain-general, and other public functionaries of the province. It is inclosed by old walls, with six gates. Columbus died in this city, May 20, 1506.

VALLA'RIS, a genus of plants of the natural family of *Apocynaceæ*. The species consist of a few twining shrubs, which are found in China, the Indian islands, and the plains of India.

VALLE, PIETRO DELLA, surnamed Il Pellegrino, was born at Rome, April 2, 1586. Possessed of an independent fortune, he spent his youth in literary pursuits. His verses procured him admission into the academy of the Umoristi. He next turned soldier, but saw little service. He afterwards became a pilgrim, and in that character embarked at Venice for the East, June 8, 1614, and continued an unsettled traveller till 1626. The letters written to his friend Schipano in the course of his travels, the first part of which was published in 1650, shortly before his death, are by far the most valuable of his works, and contains numerous details of the most interesting character. After his return to Rome he killed a coachman in a fit of anger, for which crime he was banished, but obtaining the pope's pardon, returned, and died in Rome, April 20, 1652. His letters relating to Persia were published in 1659: the third part—his Indian travels and his return to Rome—appeared in 1662. This work has been translated into French, Dutch, and German. An English translation of the last part was published in 1665. His accounts of countries are lively, picturesque, and accurate.

VALLEYS. This term may be applied in its most comprehensive meaning to depressions on the surface of the globe. The largest valleys form the beds of the great oceans. But in the common acceptation of the term, it refers to those depressions which are observable above the sea-level, separating or intersecting mountain ridges, and, in fact, breaking them up into separate mountain masses; and in which the basins of inland seas and lakes, and the beds of rivers, occur. Mountains and hills, therefore, are their boundaries. Valleys parallel to the mountain ridges or chains which they separate, or which inclose them, are said to be longitudinal: while those the direction of which is across the heights, are called transverse. Both may be principal or lateral, the latter designation being usually applied to the smaller transverse valleys uniting the principal. In all hilly and mountainous districts, valleys of every possible variety of form and magnitude occur. Of the numerous specimens in Europe, the valley of the Rhine, between Bâle and Mainz, and bordered on either side by the ranges of the Schwarz-wald and the Vosges, is the most deserving of notice, and is distinguished by great beauty and fertility.

VALLIÉR. [DRÔME.]

VALLISNE'RIA, a genus of plants, named after Antonio Vallisneri, an Italian botanist, which belongs to the natural order *Hydrocharaceæ*. Its species are all water plants. Several of them have been recorded as growing in Europe, New Holland, and America. The *V. spiralis* is found in Italy, in ditches near Pisa, and in the Rhone. There are two Australian and also an American and East Indian species.

VALLOMBROSA, a celebrated abbey in Tuscany, which derives its name—the 'umbrageous valley'—from its position in a richly wooded hollow, where pine and beech and fir cast a pleasant shade. The reader will remember Milton's allusion to this characteristic:—

'Thick as the leaves in Vallombrosa.'

Its scenery is assuredly adapted to stimulate the fancy both of poet and artist. The abbey was founded about 1080 by a Benedictine order of Grey Monks, and receiving costly endowments grew very prosperous and influential. During the French rule in Italy it was an asylum for dispossessed priests. The monks returned to it after 1815, but they are now very few in number, and their chief occupation is to act as cicerones to visitors attracted by the picturesque beauty of the site. The buildings are remarkable for splendour, rather than architectural excellence. They were erected about 1636–40.

VALOGNES. [MANCHE.]

VALOIS, LE, a district in France, comprised in the former province of the Ile-de-France, and now forming portions of the departments of OISE and AISNE. Compiègne, Senlis, Crespy, Villers-Coterets, and La Ferté-Milon, were its chief towns. Philippe III., king of France, gave the county of Valois (1285) to his second son Charles, whose son Philippe became king of France. The kings of France from Philippe VI. to Henri III. inclusive, belonged to the house of Valois.

VALONIA, a valuable tanning material, obtained from the cup of the acorn of *Quercus Ægilops*, and imported in considerable quantities from the Morea and the Levant. The imports into the United Kingdom in 1866 were 29,396 tons, value 533,577*l.*, and the exports in the same year 390 tons, value 7079*l.*

VALPARAISO, a large town and important seaport of Chili, South America, situated in 71° 45′ W. long., 33° 2′ S. lat., 55 miles W.N.W. from Santiago, and 225 N. from Concepcion, consists chiefly of long narrow streets, built under a high cliff, and along the windings of the shore of the Pacific, and has 100,000 inhabitants. Its situation is somewhat similar to Hastings, in England, and it has a very imposing appearance from the sea. The houses, which are generally only one story high, are built in a very solid manner of sun-dried bricks. Painted piazzas are substituted for balconies almost everywhere, and their different colours give the town a gay appearance. The east end, called the Almendral, is occupied by the wealthy citizens. The poorer classes reside in wretched habitations built of mud and reeds in the numerous gorges between the cliffs. The custom-house, exchange, and a few other public buildings, are handsome edifices. There are

several churches, a theatre, colleges, hospitals, and literary and scientific institutions. English is generally taught in the schools, being considered an essential branch of education. The streets are well paved. The Protestants have a cemetery and two places of worship. A handsome suburb on the cliff is chiefly inhabited by the foreign merchants, who are mostly British, American, and French. The harbour is good, with 9 fathoms water close in shore, of easy entrance and sheltered from all winds except the north; it is defended by three forts and a battery on a level with the water. In 1809 only nine vessels entered the port; in 1836 the number was nearly 500; and in 1867 it had further increased to over 2000. There are large shipbuilding yards, and extensive bonding warehouses. Many vessels engaged in the Pacific trade visit Valparaiso for provisions, which can be put on board without their dropping anchor. The town is the central depôt for the produce of Chili, and has a larger trade than any other place in the country. It is connected with Santiago by railway. The inhabitants have increased very rapidly in recent years, the population having been only 10,000 in 1825. Large quantities of corn and other articles of provisions are shipped here for Callao and Panama. Besides wheat, the chief exports are copper and copper ore, gold and silver, tallow and hides, timber, indigo, wool, sarsaparilla, fruits, &c. The imports are—foreign manufactured goods, chocolate, tea, coffee, sugar, tobacco, hardware, &c., &c. The latter are now annually valued at 20,000,000 dollars per annum, and the exports at rather more than half that amount. The British exports to Valparaiso exceed a million and a half sterling annually. The French and American commerce is also very important. Steamers ply regularly to Callao and other Pacific ports. The town was bombarded in a most cowardly manner by a Spanish fleet in 1866, and an immense amount of property destroyed. It has frequently suffered from earthquakes. The name means 'Vale of Paradise,' and was given to it in consequence of its delightful situation.

VALPY, ABRAHAM JOHN, M.A., M.R.S.L., an eminent classical printer and publisher, was the son of the Rev. Dr. Valpy, master of the Reading grammar-school, and born in 1788. Having been early imbued with classical learning under his father, he proceeded to Pembroke College, Oxford, and graduated as B.A. in 1809 and M.A. in 1811. While yet a youth he published a collection of 'Excerpta from Cicero's Epistles' (1804), with a Latin address to his schoolfellows. The object of his father was to establish him as a printer, so that he might become a worthy successor of the Aldi and Stephens of former periods, and rival the celebrated classical printer, William Bowyer. He was accordingly apprenticed to a freeman of London (Mr. Pridden), and became a liveryman of the Stationers' Company in 1807. He first commenced business in Took's Court, Chancery Lane: but afterwards removed to Red Lion Passage, Fleet Street—the very spot where the learned Bowyer terminated his career as a printer, in 1777, and was succeeded by Mr. John Nicholls, editor and proprietor of the *Gentleman's Magazine*. Mr. Valpy did not devote much of his time to the literary departments of his business, but employed men distinguished in the republic of letters by their classical attainments; among whom may be mentioned Mr. E. H. Barker, of Thetford, who edited the 'Greek Thesaurus,' printed and published by Valpy; and Mr. G. Dyer, who edited his voluminous edition of the Classics, with variorum notes, published in 143 volumes. Mr. Valpy also published a variety of works which pass the press under his immediate supervision; am the *Classical Journal*, the *Pamphleteer*, the tuagint, Homer's 'Iliad,' the 'Museum,' an English Literature; besides a vast number editions of the Greek, Latin, and English cla retired from business on an ample competenc and died in 1855.

VALPY, RICHARD, D.D., an eminen schoolmaster, was born in Jersey on the 7th of 1754. He early showed great aptitude fo and after acquiring the rudiments near hom sent to the college of Valognes in Normandy, passed five years. At the age of fifteen he in the grammar-school at Southampton, wher fested a strong desire for a seafaring life. dissuaded from this course by his mother, t naval events which occurred at various times career interested him to a degree that alway his ruling passion. Obtaining one of th scholarships for natives of Jersey, he went to College, Oxford. In 1777 he was ordaine quitting the university he obtained a master school of Bury St. Edmunds. In 1781 he head master of Henry VIII.'s school at Readi he remained for more than fifty years, and school from a very low condition to a high pit tation and prosperity. His scholarship wa deep, but he laboured hard to make the stud and Greek popular, to which end he publish grammars and other educational books. I was presented by Sir T. G. Cullum to the Stradishall in Suffolk. As he could seldom g to his parishioners, he wrote a book to give hi he called an 'imaginary presence' among t times. It is entitled 'Address from a Cle his Parishioners,' and passed through man He died at his son's house in Kensington, o March, 1836.

VALTELLI'NA, a district of northern It ing the steep slopes of the Rhætian, the Be the Septimer Alps, between the Ortler Spi Splugen, together with the valleys of the Adda, from the source of these rivers to the into the Lago di Como. The Adda rises in St and flows first S. and then W. by S. into the Maira springs in the Septimer Alps in Switz soon after entering Italy passes Chiavenna, be after being joined by the Liro coming from th it enters the Laghetto or upper Lake of Co part of the basin of the Maira forming the *Chiavenna* is the most westerly of the Valt northern portion of the basin of the Adda called the district of *Bormio*, while that side o where the Adda flows westwards has been call

Valtellina is bounded N. and E. by the A separate it from Switzerland and the Tyrol, S. and Como, and W. by a high ridge which ru the Splugen, and divides this district from eanton of Ticino. The valley of the Adda b Lake of Como and the town of Tirano is the h it has a genial climate and a fertile soil. very great in summer, and all the fruit trees of admirably. Abundance of wine, Indian c and wheat, are produced. There are excelle and meadow-land, and the cheese rivals the in Lombardy. The slopes of the lower hill northern side of the valley are covered with vi in terraces. The level land along the banks o

is not more than a mile and a half in breadth, the mountains rising gradually on both sides and forming numerous transverse valleys between their offsets. The southern ridge, which separates the district of Sondrio from Bergamo, is a lower branch of the Rhætian Alps, which detaches itself from the Ortler Spitz, and runs in a south-west direction towards the Lake of Como. Its principal summit is Monte Legnone, about 8000 feet above the sea. The district of Bormio, being more elevated than Sondrio, is colder and less fertile. The northern part of Chiavenna is likewise an alpine country, but there is a fine plain between the town of Chiavenna and the Lake of Como, which is as productive as any part of north Italy.

The principal towns are the following:—*Sondrio*, the capital of the province, is situated in a fertile territory on the right bank of the Adda, and near the confluence of the torrent Mallero, which rises in the glaciers of Monte dell' Oro in the Bernina range. It has a handsome cathedral, gymnasium, college, court of justice, theatre, hospital, and about 6000 inhabitants. *Morbegno*, a well-built little town on the left bank of the Adda and at the foot of Monte Legnone, over which there is a pass leading into the district of Brescia. Its neighbourhood has a reputation for fine cheese. *Tirano*, a large village on the Adda, is exposed to the inundations of that impetuous river, which have repeatedly threatened it with destruction. Near Tirano is a handsome church, cased with white marble and dedicated to the Virgin. An important fair is held here twice a year. *Chiavenna*, a pretty town on the Maira, in the midst of vineyards, at the branching off of the two roads that lead from Italy into the Grisons (one by the Splugen and the other by the Septimer and the Maloya), has several churches, a town-house, a castle, an hospital, manufactories of silk, pottery, paper, and cloth made of amianthus. The population of Chiavenna is about 4000, who carry on an active trade in wine, which is kept in large vessels termed 'ventorali.'

VALUE, in Political Economy, means value in exchange, or exchange value. It must be distinguished from 'value in use,' or utility. Things which have the greatest value in use have often little or no value in exchange. Air, for example, though the most absolute of necessaries, has no exchange value, because it can be obtained without labour or sacrifice. Any article whatever, to obtain a value in exchange, must certainly be of some use, conduce to some purpose, or satisfy some desire, but it must also be difficult of attainment.

In the article PRICE, the distinction between price and value is stated to be that the former expresses the value of a thing in relation to money only, the quantity of money for which it will exchange; and the latter its general power of purchasing, or command which its possession gives over purchaseable commodities in general. Bearing this in mind, the following propositions from book iii., chapter vi., of Mr. J. Stuart Mill's *Principles of Political Economy*, clearly set forth the theory of value:—

1. Value is a relative term. The value of a thing means the quantity of some other thing, or of things in general, which it exchanges for. The values of all things can never, therefore, rise or fall simultaneously. There is no such thing as a general rise or a general fall of values. Every rise of value supposes a fall, and every fall a rise.

2. The temporary or market value of a thing depends on the demand and supply—rising as the demand rises, and falling as the supply rises. The demand, however, varies with the value, being generally greater when the thing is cheap than when it is dear; and the value always adjusts itself in such a manner that the demand is equal to the supply.

3. Besides their temporary value, things have also a permanent, or as it may be called, a natural value, to which the market value, after every variation, always tends to return; and the oscillations compensate for one another, so that, on the average, commodities exchange at about their natural value.

4. The natural value of some things is a scarcity value; but most things naturally exchange for one another in the ratio of their cost of production, or at what may be termed their cost value.

5. The things which are naturally and permanently at a scarcity value, are those of which the supply cannot be increased at all, or not sufficiently to satisfy the whole of the demand which would exist for them at their cost value.

6. A monopoly value means a scarcity value. Monopoly cannot give a value to anything, except through a limitation of the supply.

7. Every commodity of which the supply can be indefinitely increased by labour and capital, exchanges for other things proportionally to the cost necessary for producing and bringing to market the most costly portion of the supply required. The natural value is synonymous with the cost value, and the cost value of a thing means the cost value of the most costly portion of it.

8. Cost of production consists of several elements, some of which are constant and universal, others occasional. The universal elements of cost of production are, the wages of the labour and the profits of the capital. The occasional elements are, taxes, and any extra cost occasioned by a scarcity value of some of the requisites.

9. Rent is not an element in the cost of production of the commodity which yields it, except in the cases (rather conceivable than actually existing) in which it results from, and represents, a scarcity value. But when land capable of yielding rent in agriculture is applied to some other purpose, the rent which it would have yielded is an element in the cost of production of the commodity which it is employed to produce. [RENT.]

10. Omitting the occasional elements, things which admit of indefinite increase naturally and permanently exchange for each other according to the comparative amount of wages which must be paid for producing them, and the comparative amount of profits which must be obtained by the capitalists who pay those wages.

11. The *comparative* amount of wages does not depend on what wages are in themselves. High wages do not make high values, nor low wages low values. The comparative amount of wages depends partly on the comparative quantities of labour required, and partly on the comparative rates of its remuneration.

12. So, the comparative rate of profits does not depend on what profits are in themselves; nor do high or low profits make high or low values. It depends partly on the comparative lengths of time during which the capital is employed, and partly on the comparative rate of profits in different employments.

13. If two things are made by the same quantity of labour, and that labour paid at the same rate, and if the wages of the labourer have to be advanced for the same space of time, and the nature of the employment does not require that there be a permanent difference in their rate of profit; then, whether wages and profits be high

or low, and whether the quantity of labour expended be much or little, these two things will, on the average, exchange for one another.

14. If one of the two things commands, on the average, a greater value than the other, the cause must be that it requires for its production either a greater quantity of labour, or a kind of labour permanently paid at a higher rate; or that the capital which supports that labour must be advanced for a longer period; or lastly, that the production is attended with some circumstance which requires to be compensated by a permanently higher rate of profit.

15. Of these elements, the quantity of labour required for the production is the most important; the effect of the others is smaller, though none of them are insignificant.

16. The lower profits are the less important become the minor elements of cost of production, and the less do commodities deviate from a value proportioned to the quantity and quality of the labour required for their production.

17. But every fall of profits lowers, in some degree, the cost value of things made with much or durable machinery, and raises that of things made by hand; and every rise of profits does the reverse.

Such is the general theory of exchange value, and these laws are as applicable to a money system as to a system of barter. Things which by barter would exchange for one another, will, if sold for money, sell for an equal amount of it, and so will exchange for one another still, though the process of exchanging them will consist of two operations instead of only one. The relations of commodities to one another remain unaltered by money; the only new relation introduced is their relation to money itself; how much or how little money they will exchange for; in other words, how the exchange value of money itself is determined. Money is a commodity, and its value is determined like that of other commodities, temporarily, by demand and supply; permanently, and on the average, by cost of production. If prices are low, money will buy much of other things, and is of high value; if prices are high, it will buy little of other things, and is of low value. The value of money is inversely as general prices; falling as they rise, and rising as they fall. If the demand for gold and silver money increases without the sources of its supply becoming more productive, the increased quantity of money required will be obtained at a greater cost, and the result must be that its value will rise. If, on the other hand, rich gold mines should be discovered, and the cost of obtaining gold should be lessened, the supply will be increased and its value must inevitably decline, unless circumstances should simultaneously happen which should cause various countries to require a greater amount of gold money. But a diminution in the value of gold, or, in other words, a rise in general prices, creates an increased employment for gold, because if the price of a commodity is increased, a greater amount of money is required to be used, each time a commodity is bought or sold. If the value of gold is depreciated one-half, the quantity of gold money required will be doubled, and thus the supply is always equalled to the demand.

Labour is the measure of real value, and real value never varies much from exchangeable value. But labour itself requires a representative, something that shall measure one kind of labour compared with another; and gold and silver are commonly used for this purpose. Gold and silver, however, vary both in real value, as above explained, and in exchangeable value: the result of all which is, that there is no measure of the exchangeable value of a thing other than the amount of gold or silver or anything else that can be got for it. Things must be exchanged either by simple barter, without any price being fixed on the things exchanged, or by an exchange of commodities, in which exchange the commodities have a money price fixed upon them; or by giving gold and silver, or other things which are current as coin, for commodities.

Labour is the sole source of wealth and of all exchangeable value, and the cost of production is an essential element in the exchangeable value of all commodities. The cost of production is the regulator of selling prices. In the actual operation of exchanges, it is the efficient demand, the will and the power to purchase, combined with the supply, that really determine the selling price of all things. [MONEY, PRICE, WAGES.]

VALVE, or SAFETY VALVE (Lat. *valva*), in Mechanics, a contrivance by means of which a boiler is preserved from bursting by the force of steam. The valve is placed on an aperture in the top of a steam boiler, and retained in position by the aid of weights heaped upon it; of a lever of the second kind; or of a lever and spring. Locomotives require two loaded valves, of which one is kept down by a pile of weights, the other by a lever and spring. Stationary engines, on the contrary, are generally fitted with one valve, which is retained in position either by weights or by lever. The valve is of peculiar value; and without it, we may say, the steam-engine could not exist. Thus, whenever the steam in the boiler rises above a certain tension, the valve gives way under the superior pressure, permits the superfluous vapour to escape, and then returns to its original position. The invention, originally due to Denis Papin [PAPIN, DENIS], is consequently one of perfect 'safety.' It is necessary, however, to be assured that the valves are not subjected to too great a weight, or serious accidents, only too common on the American steamboats, will invariably ensue.

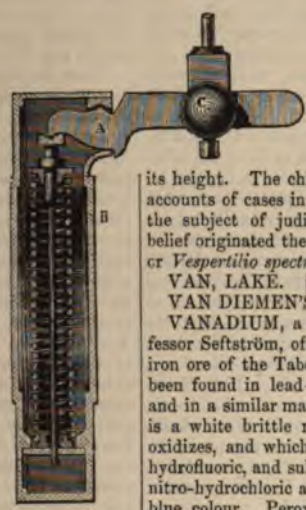
An improved safety-valve balance, the invention of Mr. William Cameron, of Reading, U.S., which has been for some time in use on the American railroads, deserves to be generally adopted in the United Kingdom. It was intended at the outset for locomotive engines, in which a dead weight cannot be used with boilers that rest on springs, as its action on the valve would be influenced by the vibrations continually occurring. It can be used, however, on marine engines, or wherever a dead weight is considered objectionable. Its chief recommendation is, that it requires no attention when in use, as it forbids an increase over the allotted pressure. The arms, A A, can rise as much as the safety-valve requires without additional pressure, which renders the balance equal in efficiency to a dead weight. Another great advantage is in the lever arrangement, by which means existing defects are remedied. The arms of the lever, A, inside the casting, B (fig. 1), from the fulcrum to the springs, are at an angle with the outside arms; and an upward movement of these outside is accompanied by a corresponding downward and also inward movement of the inside arms resting on the springs: therefore the more the springs are compressed the shorter the effective length of the inside will be, thereby increasing the power of the outside arms in the same proportion as the springs get stiffer from compression, thus enabling them to rise the required distance without increase of power. The rod, C, is fastened by a set screw to any distance from the fulcrum, according to the pressure required. Close behind this rod a small pin can be inserted through the arm to prevent the engine

from increasing the pressure beyond what the boiler was intended to carry; but as much of the arms as are not in the way of anything may be allowed to protrude for the purpose of decreasing the pressure, should any accident to the boiler make such a course desirable.

The ordinary pump-valve, frequently called a clack, consists of a piece of leather rather greater than the bore or orifice. Circular plates of lead or brass are fastened to the upper and lower surfaces of the leather; and the valve thus formed is capable, from the flexibility

Fig. 1.

Fig. 2.



of the leather, of turning, as on a hinge, at the place of its connection with the rim. After a certain quantity of water has forced its way through the orifice, the valve, by its weight, falls, and closely covers the opening, so that the water above is in great part prevented from returning.

Frequently a narrow bar of metal is made fast across a circular orifice in the direction of a diameter, and two semicircular valves of leather, each of which is covered above and below with a brass plate of the same form, turn upon the sides of the bar as upon hinges. This is called the Double-clack, or the Butterfly-valve.

The conical or Spindle Valve is a metal body in the form of a frustum of a cone, the side of which makes an angle of 45 degrees with a diameter of the base, and its convex surface is ground so as to fit exactly the corresponding side of the orifice. The frustum is lifted up vertically by the pressure of the steam, and when that has passed, it falls back by its weight.

The valve employed for the usual air-pumps consists merely of a slip of thin bladder thoroughly soaked in oil, its breadth being little more than is necessary to cover the orifice. When the pressure of the atmosphere is in part removed from the barrel, some of the air which is in the receiver forces its way, by its elasticity, through the orifice, and escapes at the sides of the valve. The valves of machines for condensing air are like those of a rarefying pump, but are placed in contrary positions.

VALVE, in Botany, is a term applied to several parts of plants. Its most common application is to the parts of dehiscent fruits, which are in most cases the representative of the carpellary leaf.

VAMPIRE (German, *Vampyr*). According to Dom Calmet's 'Dissertation sur les Vampires,' the vampire is a dead man, who returns in body and soul from the other world, and wanders about the earth, doing all kinds of mischief to the living. Generally he sucks the blood of persons asleep, and thus causes their death. Those who are destroyed in this way themselves become vampires. The only manner of getting rid of such unwelcome visitors is, according to this author, to disinter their bodies, to pierce them with a stake cut from a green tree, to cut off their heads, and to burn their hearts.

The superstition about the vampires is chiefly prevalent in some parts of eastern Europe; and it was during the five years from 1730 to 1735 that it reached its height. The chief periodicals of that time contain accounts of cases in Hungary; and many of them were the subject of judicial proceedings. In this strange belief originated the popular name of the Vampire-bat, or *Vespertilio spectrum*. [CHEIROPTERA.]

VAN, LAKE. [ARMENIA.]

VAN DIEMEN'S LAND. [TASMANIA.]

VANADIUM, a metal discovered in 1830 by Professor Seftström, of Fahlun, in iron prepared from the iron ore of the Taberg mines, in Sweden. It has also been found in lead ore from Wanlock Head, Scotland, and in a similar material from Zunapnù, in Mexico. It is a white brittle metal, which neither air nor water oxidizes, and which, though insoluble in hydrochloric, hydrofluoric, and sulphuric acids, is soluble in nitric and nitro-hydrochloric acids, yielding solutions of an intense blue colour. Peroxide of vanadium, or Vanadic acid ($V O_3$), is very slightly soluble in water. Its tint is orange, and it unites with the salifiable bases. It is distinguished from chromic acid by the action of deoxidizing substances, which give a blue solution with vanadium, and a green one with chromium. Both acids, when heated with borax in the reducing flame of the blow-pipe, yield a green glass; but the bead turns yellow in the flame if vanadium is present. The equivalent of vanadium is about 18. It forms two chlorides, $V Cl_2$, and $V Cl_3$.

VANBRUGH, SIR JOHN, was born in 1666, but whether in Chester or London is uncertain. He is supposed to have studied architecture in France. It has been suggested that his appointment in 1695 as commissioner for completing Greenwich Hospital, was made in consequence of his architectural knowledge: but it is quite as likely that he obtained it, as Sir Christopher Wren had some years before the post of surveyor-general, through court interest, and made himself acquainted with its duties afterwards. Vanbrugh became first known to the public as a writer of comedies; his 'Relapse, or Virtue in danger,' having been acted for the first time, and with great applause, in 1697. It was followed by the 'Provoked Wife,' the 'Confederacy,' and seven or eight others. His first great, and in many respects his most successful architectural effort, was Castle Howard, completed in 1703, for the earl of Carlisle. It brought Vanbrugh abundant fame; and the earl, who was then lord-chamberlain, as a mark of his satisfaction, bestowed on him the office of Clarencieux king-at-arms. He retained the office

and received the salary from this time, till a month before his death. Blenheim, his other great work, was commenced in 1705 and completed in 1722. In it he put forth all his powers, yet the building was a source of infinite vexation to him. Blenheim was a portion of the national reward for the victories of Marlborough, and whilst the duke lived the course of the architect was comparatively smooth. But after his death the government withheld the funds for carrying on the works; and what was worse, the duchess quarrelled with the architect, and though she followed his designs, employed another to complete the building. Nor did those designs experience much more gentle treatment. Architects and critics denounced the building as a 'hollowed quarry,' in which appeared the style of no age and no country; a stupendous pile which defied all rules, and yet might outlast all record. And the wits, among whom Swift and Pope were conspicuous, were even less measured in their sarcasms than the critics. It was not indeed till half a century later, when Sir Joshua Reynolds made Vanbrugh the subject of an elaborate eulogy in his 'Thirteenth Discourse,' that any one ventured a word in his favour. Opinion has now pretty well settled down on the subject. The grandeur of conception, massiveness, solidity, and picturesqueness of the architect's style are admitted; but it is felt that at Blenheim still more than at Castle Howard the parts are out of all proportion, disconnected and confused, and that the whole is deficient in simplicity and repose. Vanbrugh erected a great many other country mansions—Eastbury, Dorsetshire; Grimsthorpe and Duncombe Hall, Yorkshire; Seaton Delaval, Northumberland; King's-Weston, near Bristol; and Oulton Hall, Cheshire. He also built, and conducted as a joint speculation, a theatre in the Haymarket, on the site of the late Italian Opera House, burned down in December, 1867. It was opened in 1706; but though Congreve was his partner and Betterton the manager, the speculation did not succeed, and Vanbrugh withdrew from it. Besides the appointments mentioned above, he was surveyor of Greenwich Hospital and of the royal gardens and waters, and comptroller-general of works. In this last capacity he, about 1722, put forth a plan for a complete system of sewerage, and the new paving of London. He was knighted at the accession of George I. in 1714, and died at the house he had built for himself in Scotland Yard, Whitehall, March 26, 1726.

VANCOUVER, GEORGE, was born in 1758. He served as a midshipman on Cook's second voyage (1772-1775); and on the third voyage, in which that great navigator lost his life (1776-1780). He was promoted to a lieutenancy and appointed to the *Martin* sloop. In this and other vessels he served chiefly in the West Indies, until September, 1789, when he returned to England in command of the *Europe*. In March, 1791, he was appointed to a vessel called the *Discovery*, on an expedition to the north-west coast of America. His instructions were, to receive the surrender of Nootka by the Spaniards; to make an accurate survey of the coast from 30° N. lat. northwards; and to inquire after any communications, by inlets, rivers, or lakes, between the coast and Canada. The expedition sailed from Falmouth April 1, 1791. The greater part of the north-west coast of America was carefully surveyed in boats under his directions. He entered the Shannon, on his return, September 13, 1795.

In 1794 Vancouver had been promoted to the rank of post-captain. He was paid off at the conclusion of his voyage, and from that time till his death, in May, 1798, busied himself in preparing his journals for publication.

VANCOUVER'S ISLAND, or QUADRA, a large island in British North America, forming, with British Columbia, one of the colonies of Great Britain. It lies between lat. 48° 19′ and 51° N.; and long. 123° 17′ and 128° 28′ W. Its length from N.W. to S.E. is 278 miles, and its breadth varies from 50 to 65 miles. The area is 13,000 square miles, and the population in 1861 was 23,000, of whom about half were aboriginal Indians. On the E. and N.E. it is separated from the mainland of British America by the Gulf of Georgia and Queen Charlotte's Sound, and on the S. from that of the United States by the Strait of Juan-de-Fuca; on the N. and W. it lies open to the North Pacific.

Coast, Surface, &c.—The shores of the island, which have been carefully explored, are generally high, steep, and rocky, nearly unbroken on the N.E., but presenting in other directions numerous indentations, many of which are so completely land-locked, either by projecting promontories, or minor islands, stretching across their mouths, as to form excellent natural harbours. Among them may be mentioned Nootka Sound on the W., and Camosack or Victoria Harbour in the S. The only navigable river is that of Nimkis, in the N.E. Summer streams and perennial springs are numerous, and the water is excellent. The greater part of the island is a mountain ridge, which rises in its highest peak, Mount Arrowsmith, to 6000 feet, and the buttress-like walls of which descend for the most part abruptly to the shore. There are, however, in many coast districts, especially on the S.E. and E., undulating tracts, in general thickly wooded with fir trees, but here and there containing patches of open grass-land. The outline of the island is boldly picturesque. The surface is diversified by mountain, precipice, hill, dale, and lake, and the whole country is more or less densely wooded. Fogs, remarkable both for density and duration, are of frequent occurrence. The winter is very stormy, and heavy rains fall, particularly in November and December. Taken altogether, however, the climate is genial, productive, and salubrious. Frost occurs on the lowlands in January, but seldom continues long, and can scarcely be said to interrupt agricultural operations. Vegetation begins to advance in February, makes rapid progress in March, and continues to be fostered by alternating warm showers and sunshine in April and May. The summer heats of June and July are excessive, and by the end of August, or beginning of September, the long grass has become so thoroughly parched as to be easily ignited.

Productions, Inhabitants, &c.—Only a small portion of the surface is suited for agriculture, four-fifths being little better than barren rock. The crops generally raised are wheat, barley, oats, and peas. The green crops are turnips, mangold-wurzel, vetches, potatoes, and all sorts of vegetables. Fruit culture is a profitable branch of industry. The strawberry, raspberry, currant, and gooseberry are indigenous. Tall pine is the principal forest tree, but cypresses, cedars, and oaks are found in the woods, and timber has been exported in large quantities. Roses, with the hawthorn and myrtle, are also indigenous. Coal, copper, silver, lead, and iron ore are abundant. Gold of excellent quality is found, but up to the present time has not been profitably worked. The principal products, in addition to those of the soil, are furs, obtained chiefly from the beaver, raccoon, land otter, and sea otter; and fish of the most

valuable species abound on all parts of the coasts. The puma, bear, and wolf still range in the forests; two kinds of deer are found, and grouse, snipe, and wild fowl are in great variety. The natives, belonging to twelve tribes, of which the Kawitchin, Quaquidts, and Nootka are the most numerous, are estimated at 11,000. They appear to be industrious and friendly, though much addicted to thieving. The singular custom prevails amongst them of flattening the skull in infancy into a kind of sugar-loaf shape, by artificial means, but it does not seem to be productive of any mental deficiency. The British population of the island is about 3000, and there are about 8000 other Europeans, negroes, and Chinese.

A recent visitor to Vancouver's Island gives the following general description of its scenery:—

The whole road from Victoria to Sooke mines lies through a forest of firs, there being little other timber on the island. All the houses at the mines are log ones, of course, and badly built. Such is even the case with the largest. There is no window, and the temperature inside, except close to the log fire, is the same as that outside. The gold is found chiefly on Leech River, a branch of the Sooke, and a creek called Woolfe's Creek. The rivers are all rocky, shallow, impetuous mountain streams, scarcely deserving the name of rivers. The gold found is very fine, what is termed by miners 'pretty' or 'good.' The country at Sooke is more heavily timbered than any place I have yet seen, and I was informed that in this respect it was rougher at Sooke than in Cariboo, British Columbia. I was told that the timber on the island was celebrated for its immense size, but it is not nearly so fine as in Canada. Sooke is very cold in winter, lying among the mountains, which form the backbone of the island, running through its whole length about halfway between shore and shore, and rising about 6000 feet above the sea. The principal food of the miners is venison, which is very abundant and good, bread baked in hot ashes, bacon, molasses, and apple sauce. Deer can be purchased at Comax, the most distant settlement, at half a dollar apiece. Wild ducks, which are capital eating, are 25 cents a pair, wild geese half a dollar; but flour is on an average 14 dollars a barrel. Many of the settlers are Cariboo miners, and some have also mined in Australia. They live a half-savage life, having no regular communication with any other place—Nanaimo the nearest, being 70 miles distant—with often two tribes of Indians residing among them, ready and bold to steal whatever they can get. At Nanaimo there are a pretty little church and a Methodist chapel. About 30,000 tons of coal were exported last year. There were 800 inhabitants here, and at present Nanaimo is more flourishing than Victoria. Between the two towns the navigation is dangerous, the coast in most places being inaccessible, abounding in reefs and sandpits, and the sea full of small rocks, many of them just even with the water, or a little below. The tides are never to be depended upon, and the gales are very frequent and strong. But in fine summer weather the sail from Victoria to Nanaimo is delightful. The island cannot be called a good agricultural country. There is very little open land, and it is hardly worth the farmer's while to cut the heavy timber off. There are as yet no roads to Victoria (the only market for agricultural produce), and no rivers to serve for internal communication. The spots of open land are so small and scattered that in very few parts do a sufficient number of settlers live near enough to each other to have a church, stores, &c. The capital required is very large. A yoke of oxen costs 300 dollars; horses, the same; a good cow, 50 dollars to 60 dollars. Land is extremely high; the lowest price is 6 dollars an acre, and this at a distance of 40 miles from market, and not on the sea-shore (a most important thing where there are no roads), and not even a fence on the place. It is all in the hands of individuals or companies. About 4 miles from town, for some land partly fenced in, partly rock, the best covered with large stones, 50 dollars an acre are asked, and in some cases even 100 dollars.

Government, Commerce, &c.—Vancouver's Island was supposed to form part of the mainland till 1789, when the captain of an American vessel sailed through the E. channel which separates the two. In 1792 it was visited by Vancouver, who gave it the name of Quadra and Vancouver; the former, conferred in compliment to the Spanish commandant of Nootka Sound, has fallen into desuetude. The property of the whole island was granted in 1849 to the Hudson's Bay Company, under the express condition of colonizing it. The agents of the Company had long been accustomed to visit it regularly for the furs and other commodities provided by the natives, but it attracted little attention till 1846, when the discussion of the United States boundaries brought it prominently into view. By the boundary treaty, the entire possession of it was formally fixed with Great Britain, and there seems no reason to doubt that its important commercial and military position, its harbours, and its coal mines, destine it ere long to occupy a prominent place among our colonial territories. Upon the expiration of the Hudson's Bay Company's lease in 1859, the island was erected into an independent British colony, and in 1866 it was united with British Columbia under one governor. The Legislative Council is composed of five *ex officio* and three non-official members nominated by the crown. The Legislative Assembly consists of fifteen members, elected by 1213 voters. The revenue is raised by direct taxation, and amounted in 1865 to 88,894*l.*, being contributed mainly by a real estate tax of 1 per cent., port and harbour dues, land sales, liquor licenses, and trade licenses. The expenditure in the same year was 90,278*l.*, including 20,000*l.*, repayment of loan. The public debt of the island was 40,000*l.* The value of the imports in 1865 was 594,297*l.*, of which 202,474*l.* was from the United Kingdom. The imports are mostly cotton, linen, and woollen manufactures, apparel, haberdashery, machinery, hardware, tea, spirits, wine, beer and ale. The exports amounted to 546,452*l.*, inclusive of 426,198*l.* worth of gold, sent chiefly to the United States. The year 1865 was the first in which any articles had been exported directly from Vancouver's Island to Great Britain. Their aggregate value was 26,804*l.*

During the same year the discovery of gold diggings within 20 miles of Victoria pointed out a new source of prosperity. The low cost at which the miners can subsist, compared with those of British Columbia, will probably render these mines both profitable and attractive, though the yield of gold be comparatively small. The great want in this, as in all other new countries, is a fixed population, and this can scarcely be expected till the excitement attendant upon the first discovery of gold has subsided, and communication with the mother country is facilitated and cheapened. The want of direct mail communication with England is a serious discouragement and a great detriment to our interests in the Pacific.

The island is divided into eight districts, named Victoria, Esquimalt, Metchosin, Sooke, Taanich Lake,

Saltspring, and Nanaimo. The capital, *Victoria Town*, also the seat of government for British Columbia, is situated on a sheltered river-like harbour of the south coast, and has rapidly acquired a town-like appearance, from being, in 1858, a small collection of log-built dwellings. Temporary wooden shells of houses and shops, hastily run up when the place was an experiment, have been replaced by substantial brick ones, and the streets have been macadamized. There are two churches, and several chapels. The town contains the government buildings, a small theatre, public library, concert room, and a prison, in which the inmates are usually those guilty of selling ardent spirits to the Indians. There are eighty-five retail and twenty-three wholesale public-houses in the town, and forty-one in other parts of the island. Beacon Hill, a grass-covered mound, a favourite promenade of the inhabitants, is inclosed by a natural park of oaks and other trees, with a race-course and cricket ground at the immediate base. From its summit the snow-capped Mount Baker in the United States is a grand object on the eastern horizon. Victoria is a free port—that is, there are no customs duties—which has contributed materially to its success. Population, 7000.

Nanaimo, on the east coast, has attracted a population of 800, engaged at the coal mines in the vicinity, and in the shipment of the produce, an increasing quantity of which is regularly exported. Coal has been mined here since 1853; the mines are worked by a company. There is an Episcopal church and a Wesleyan chapel in the place. The other settlements are of little importance.

(The best work of reference on Vancouver's Island is *Vancouver's Island and British Columbia, their History, Resources, and Prospects*, by M. Mackfie, F.R.G.S.; London, 1865.)

VANDA, a genus of plants, which gives its name to the tribe *Vandeæ*, of the natural family of *Orchidaceæ*. The name is that of one of the species, *Vanda Roxburghii*.

VANDALS (Lat. *Vandăli*), a name frequently mentioned in early history, as applied to those ruthless invaders of Western Europe who were mainly instrumental in overthrowing the Roman power. They were of Teutonic and Sclavonic origin, and resided chiefly in Pomerania and Eastern Prussia; but on the decline of the Western empire, being a warlike race, left their native wilds, and overran the greater part of Europe. From their fierce and destructive character, the term, as applied to them, has come into modern use proverbially to signify a barbarian, or ferocious person.

VANDE'LLIA, a genus of plants of the natural family of *Scrophularineæ*, so named from Vandelli. They are natives of warm parts of the world, such as India, Burmah, China, and Brazil. The only species which has attracted any particular notice is *V. diffusa*, a native of Brazil. It is said to be emetic, and its decoction is useful in fevers and liver complaints.

VANDER HELST, BARTHOLOMEW, was born at Haarlem in 1613. He was one of the best portrait painters of his time. He painted likewise small historical pieces, and displayed much ability in landscape painting. The date of his death is uncertain, but it was after 1668.

VANDER HEYDEN, JAN, was born at Gorcum in 1637. He studied under an obscure painter on glass, and commenced without other instruction to paint pictures of old buildings, churches, palaces, and other architectural subjects. Sir Joshua Reynolds says that his works have 'the effect of nature seen in a camera-obscura.' There are several in this country. One of his best is a view of the town-house of Amsterdam: it is now in the Louvre.

VANDER MEULEN, ANTONY FRANCIS, was born at Brussels in 1634. He was the scholar of Peter Sneyers, and painted some good battle-pieces in the style of his master while still very young. The French minister Colbert invited him to Paris, where he was allowed a pension by Louis XIV., besides being paid handsomely for his works.

He accompanied Louis XIV. to the Netherlands in some of his campaigns, and made drawings of the sieges, battles, and engagements in which the king was successful. He died at Paris in 1690.

Peter Vander Meulen, brother of the above, painted some battle-pieces for William III. of England: he came to this country in 1670. He was originally a sculptor.

VANDERVELDE, ADRIAN, born at Amsterdam in 1639, was a scholar of John Wynants. He excelled in landscapes and cattle, and he painted figures in the pictures of Wynants, Vander Heyden, Ruysdael, Hobbima, Moucheron, and others. He executed likewise some historical pieces. He died in 1672.

VANDERVELDE, WILLIAM, called the Elder, to distinguish him from his son of the same name, was born at Leyden in 1610. He appears to have been bred to the sea; and having distinguished himself by some drawings of sea-fights, was commissioned by the States of Holland, in 1666, to accompany De Ruyter for the purpose of immortalizing on his canvas whatever engagements might take place between the Dutch and English fleets. He made drawings of the great sea-fight which took place off Ostend, in June of that year. By these and other designs he acquired such a reputation that in 1675 he was invited to England by Charles II., who granted him a pension of 100*l.* per annum. He died in London in 1693, and was buried in St. James' churchyard.

VANDERVELDE, WILLIAM, the Younger, was born at Amsterdam in 1633. He came early to this country, and lived probably with his father at Greenwich: he died in London in 1707. He was at first taught by his father, and afterwards by Simon de Vlieger. The works of the younger Vandervelde are very valuable: the best of them are in England. He left a son of the same name, who also painted sea-pieces, and made good copies of the works of his father. He died in Holland.

VANDER WEYDE, ROGER, a painter of Brussels, born in the latter part of the fifteenth century. According to Vanmander, he was one of the first to reform the style of design of the Flemish painters; he divested it considerably of its Gothic manner, was correct in his proportions, and successful in expression. He painted portrait and history: there are, or were, four very celebrated pictures by him in the town-hall of Brussels, illustrating remarkable acts of justice. Vander Weyde died in 1529, in the prime of life.

VANDYCK, SIR ANTONY, was born at Antwerp, March 22, 1599. His father was a glass-painter of Hertogenbosch (Bois-le-Duc), and gave his son his earliest instructions in drawing. He is said to have been the first pupil of Van Balen, but was afterwards placed with Rubens, and under that great master he made such progress as to be intrusted with the execution of some of his sketches.

At the age of twenty he set out for Italy. He spent some time in Venice and in Genoa, where he painted many excellent portraits. He next went to Rome, where he was also much patronized, and lived in great

style. Whilst at Genoa he received an invitation to visit Palermo, whither he went and where he was extensively employed. He soon, however, returned to Genoa, and thence to his own country.

His first picture executed at Antwerp was a St. Augustin, for the church of the Augustines in that city, by which he established his reputation as one of the first painters of his time. He painted several other excellent historical pictures, but acquired greater fame by his portraits. From Antwerp he repaired to the Hague at the invitation of the prince of Orange, Frederick of Nassau, and painted many portraits at that court. About 1632 he was invited to England by Charles I., who lodged him at Blackfriars, knighted him, and in 1633 granted him an annual pension of 200*l.* for life, with the title of painter to his Majesty, besides paying him liberally for his works.

Vandyck was indefatigable in his application. He is said to have painted a portrait in a day. He acquired large sums of money, but his tastes were expensive, and he lived in such a manner as to induce a premature termination of his career. He died in London in 1641, aged forty-two.

He is generally allowed to dispute the palm with Titian in portrait painting, and is by some accounted upon the whole superior to him. Many of his best works are in this country, at Windsor Castle, at Wilton House, at Blenheim, and in other collections. His masterpiece, in the opinion of Walpole, is the portrait of the earl of Strafford and his secretary, Sir Thomas Mainwaring, at Wentworth House.

VANDYKE, a pointed collar of lace or sewed work worn by both sexes during the reign of Charles I., and to be seen in portraits painted by Vandyck.

VANE, SIR HENRY, a statesman who took a prominent part in public affairs during the reign of Charles I., was descended from a family which could trace itself back to the earliest times of English history. They sprang from Howel-ap-Vane of Monmouthshire, whose son Griffith married Lettice, daughter of Bledwin-ap-Kenwyn, lord of Powis. Henry, the representative of the family in 1356, was knighted on the field of Poictiers, as the reward of his remarkable bravery in that battle. Sir Henry was born in 1589, and received knighthood from King James in 1611. He then passed over to the Continent, where he spent three years, and acquired a knowledge of many foreign languages. Shortly after his return to England in 1614, he was elected member for Carlisle, which he represented also in the parliaments of 1620 and 1625; and was appointed by James cofferer to the prince, who continued him in this office on his own accession to the throne, and made him a member of his privy council. In 1631 he was appointed ambassador extraordinary to the courts of Denmark and Sweden, and concluded with these countries treaties of great importance to the interests of England. In 1639 he was made comptroller of the household, and a few months later was appointed principal secretary of state—the highest office in the administration. Throughout the contest between Charles and the Parliament, Sir Henry was gradually drawn along in the wake of his illustrious son. He died in 1654. Sir Henry Vane is described by Clarendon as a bustling man, who had 'credit enough to do his business in all places, and cared for no man otherwise than as he found it very convenient for himself.' He is entitled, however, to high praise as a diplomatist.

VANE, SIR HENRY, the younger, was born about 1612. He was the eldest son of the preceding and of Frances Darcy, a lady of an old family in Kent. After some preparatory studies at Westminster School, he became a gentleman commoner of Magdalen Hall, Oxford; but, according to Wood, left the university from his decided objection to take the oaths of allegiance and supremacy. He spent some time in France, and more in Geneva, and brought back with him to England, as Clarendon alleges, 'a full prejudice and bitterness against the church, both against the form of the government and the liturgy.' In 1635 he went, for conscience' sake, to the infant colony of New England, where his personal character and abilities speedily attracted the attention and gained the confidence of the colonists, and in the year following he was elected governor. Disputes, however, soon arose, and finding his best hopes and purposes baffled, Vane returned home in 1637. On his arrival in England he married; and, through his father's interest, was joined with Sir William Russell in the office of treasurer of the navy. In 1640 he was knighted. He sat for the borough of Kingston-upon-Hull in the Parliament which met 13th April, 1640, and again in the Long Parliament. On the final appeal to arms being made, Sir Henry surrendered his patent of treasurer of the navy, considering the fees (which by reason of the war amounted to nearly 30,000*l.* a year) exorbitant, only desiring that 2000*l.* a year should go to a deputy whom he had bred to the business. When the Independents sprung up, he became one of their leaders. He did not approve of the force put upon the Parliament by the army, nor of the king's execution, and withdrew for some time from public affairs.

Upon the establishment of the Commonwealth he was appointed one of the council of state; and in 1652 was for a time president of the council, and at the same time one of the commissioners of the navy. Towards the end of 1651 he was nominated one of the commissioners to be sent into Scotland in order to introduce the English government there.

Vane was one of those who would not submit to the administration of Cromwell. In 1656, as he persevered in his hostility, which he displayed in a book entitled 'A Healing Question Propounded and Resolved,' he was imprisoned for some time in Carisbrook Castle, in the Isle of Wight. But he remained inflexible both under Oliver and his successor.

After Richard's abdication, the Long Parliament constituted Sir Henry one of the Committee of Safety, and also a member and afterwards president of the council of state. But he subsequently lost the favour of the house, and was banished for a time to his residence at Raby.

On the king's restoration Vane was one of the twenty persons excepted out of the Act of General Pardon and Oblivion. In July he was committed to the Tower. In January, 1660–61, an insurrection of the Fifth Monarchy Men broke out, and Vane, who had countenanced them, was arraigned June 2, 1662, having been indicted for high treason before the Middlesex grand jury the preceding term. Vane, who was denied the assistance of counsel, spoke in his defence with great spirit and courage; but he was found guilty of high treason, and beheaded on Tower Hill, June 14.

Sir Henry Vane was the author of various publications, both political and theological. Of the latter the most remarkable is 'The Retired Man's Meditations,' &c. His life has been related with much genius, but in an over-partial spirit, by John Forster, in his 'Lives of Eminent British Statesmen.'

VANGUE'RIA, a genus of plants of the natural

family of *Rubiaceæ*, which has been so named from an alteration of its vernacular name in Madagascar. The species are few in number: the principal are *V. edulis* of Madagascar, and the Indian *V. spinosa*. The fruit of the *V. edulis* is eaten by the natives of Madagascar and of the Mauritius, where it has been introduced, as well as into Hindustan.

VANILLA, a genus of plants, the type of Lindley's natural order *Vanillaceæ*.

As the greater portion and the finest kinds of the vanilla of commerce are imported from Vera Cruz, the most important species must be natives of Mexico.

V. aromatica, Aromatic Vanilla, is the *Epidendrum Vanilla* of Linnæus, and indigenous to Brazil. Under this name have been included two or three species, one of which alone yields vanilla. *V. claviculata*, Tendril-bearing Vanilla, is a native of the Antilles in woods, and in the mountainous inland parts of Jamaica. The stem climbs to the height of 20 or 30 feet, and appears as if jointed at the insertion of each leaf, from a slight swelling. *V. grandiflora*, Large-flowered Vanilla, is a native of French Guiana, and, Lindley supposes, may produce some of the vanilla of commerce. *V. planifolia*, the Fragrant Vanilla, belonging to Mexico and several parts of South America, is also stated by Royle to be an inhabitant of the East Indies. It was introduced into this country in 1800. As it very rarely flowered, and never produced fruit in Europe, it was never suspected to be the plant that yielded the vanilla of commerce; but M. Morren, of Liège, has succeeded in obtaining abundance of fruit from this plant; and from their character there is little doubt that they are the same as those brought from America.

The fruit is the only part that is used. It has a balsamic odour, and a warm agreeable flavour. For these properties it is indebted to a peculiar volatile oil, and to a considerable quantity of benzoic acid. It is gathered when it gets yellow, and is first allowed to ferment for two or three days: it is then laid in the sun to dry, and when about half dried is rubbed over with the oil of cocoa, is again exposed to the sun to dry, and oiled again a second time. It is then collected in small bundles, and wrapped up in the leaves of the Indian reed. Neither in Guiana nor in Mexico is the vanilla plant cultivated, but the fruit is collected by the natives, who sell it to the Europeans. The imports into the United Kingdom in 1865 amounted to 11,250 lbs., value 3666*l.*; and in the same year 5486 lbs., value 1783*l.* were exported.

VANISH (Mathematics). A quantity is said to vanish, or to become evanescent, when its arithmetical value is nothing, or denoted by 0.

VANLOO, JEAN BAPTISTE, was born at Aix in Provence, in 1684. His grandfather Jacques was skilful in portraiture, and his father Louis Vanloo excelled in design and was a good fresco painter. He was educated in Paris in the French Academy, but settled at Aix in Provence in 1683.

Although much occupied with portraits, in which branch he received the highest patronage, he applied himself to historical pieces. In 1731 he was made a member of the Academy, and in 1735 appointed professor. He painted a picture of Diana and Endymion on his reception into the Academy. Notwithstanding his great success, a large family and an unsuccessful speculation rendered constant exertion necessary. He came, in 1738, with two of his sons to London, and met with great favour. He retired to Provence in October, 1742, and died there in April, 1746.

Vanloo had five sons, one of whom, Louis Michel, became painter to Philip V., king of Spain; and another, Charles Amadée Philippe, painter to Frederick the Great of Prussia.

VANNES. [MORBIHAN.]

VANSOMER, PAUL, was born at Antwerp about 1576. He was instructed by his brother Bernard, a good painter of conversation pieces and portraits. Paul came to England about 1606, and met with great success. There is a portrait of James I. at Windsor, and another at Hampton Court, painted in 1615; and he has left portraits of many of the principal personages of that time. He died in London, and was buried in St. Martin's-in-the-Fields, January 5, 1621.

VAPOUR. When a solid or liquid body, in consequence of being exposed to an elevated temperature, becomes for the time being aeriform, it is termed a vapour. From the gases vapours are distinguished by the circumstance that, when withdrawn from the source of heat, they reassume their previous state, liquid or solid. This distinction is not, however, as was formerly supposed, absolute, since the valuable researches of the late Dr. Faraday have shown that many gaseous bodies, formerly considered permanent, may be liquified and even solidified under the influence of an extremely low temperature and of great pressure. Hence it is now held that a gas is merely the vapour of a body which at lower temperatures than that of the earth's atmosphere would appear as a liquid or solid, whilst a vapour, in like manner, if the atmosphere were of a higher temperature, would be considered as a gas. The distinction between the two is, therefore, merely relative, being based upon the ordinary temperature and pressure at the earth's surface. [EVAPORATION; LATENT HEAT.]

VAPOURS are a disease of nervous debility, in which a variety of strange images float in the brain, or appear as if visible. Hence, hypochondriacal affections and spleen are sometimes called vapours.

VAR, a department in France, consisting of a portion of Lower Provence, is bounded N. by Basses-Alpes, N.E. by the newly-formed department of Alpes-Maritimes, S. and S.E. by the Mediterranean, and W. by Bouches-du-Rhône. The department was named from the Var, which was formerly its chief river, and served as its boundary on the E.; but it now belongs entirely to the department of Alpes-Maritimes. The area is about 2770 square miles, or 1,800,000 acres; and the population in 1861 was 315,526.

Physical Aspect.—The coast of Var is rocky, indented by several bays, and skirted by numerous islands. The principal bays are those of Antibes, Fréjus, Hyères, Giens, and Toulon; some of which present a low sandy shore. Of the islands, several of which are fortified, the most important are the Hyères group and the isle of Sainte-Marguerite, opposite Cannes.

The department is mountainous. A branch of the Alps extends from E. to W. through it, forming the watershed between the Durance and the Mediterranean. Another range parallel to the above extends along the coast between Hyères and Fréjus, separating the shore from the course of the Argens, which river, after draining the valley, turns S.E., and flows past the eastern extremity of the range into the Mediterranean, near Fréjus. The highest point in the department is the summit of La-Sainte-Baume on the borders of Bouches-du-Rhône, which is 3285 feet above the sea. The mountains along the coast contain granite and clay slate; the range N. of the valley of the Argens is chiefly calcareous: but in both hills are met with containing sand,

gravel, fossil shells, carboniferous deposits, and volcanic products.

Minerals, Hydrography, &c.—Among the minerals of the department are—iron, lead, manganese, coal, lignite, marble of various colours, alabaster, porphyry, granite, serpentine, jasper, and gypsum. Mining having proved unprofitable, has been generally abandoned. There are saltworks on the seashore, especially at Hyères.

Var is well watered, but the rivers are small and not navigable, with the exception of the Argens. The Gapou or Gapeau in the west, the Argens in the centre, and the Siagne and Loup in the east, flow into the Mediterranean, and with their several tributaries belong wholly to this department. The Verdon, which flows into the Durance, forms in one part the northern boundary. The Durance itself just touches the north-west corner. Lagoons of considerable extent are found near the coast, the chief of which are those of Pesquier in the isthmus of Giens, and those of Napoule and Villepoy, near the eastern limit. There are railways from Marseilles to Toulon; and from Toulon to Nice.

Climate, Soil, and Products.—The climate is, for the latitude, temperate: the winters are mild except when 'the mistral' blows. The south-east wind is very relaxing. The soil is by no means favourable, taken as a whole, however fertile particular spots may be; and from the hilly nature of the country, cultivation is carried on chiefly by manual labour. The corn grown does not suffice for more than two-thirds of the consumption. The meadows do not amount to more than about 20,000 acres; but there is a considerable extent of open pasture: in summer, however, the grass is so scorched up that the sheep, which are numerous, are sent at that season to feed in the mountain pastures of the department of Basses-Alpes. Goats, mules, asses, and pigs, are numerous. Among the wild animals are wolves and foxes; and game is abundant. The vine and the olive are cultivated in terraces on the slopes of the hills. The vineyards cover about 170,000 acres, and yield white, red, and good muscatel wines. The pomegranate, citron, lemon, orange, almond, and fig, thrive in the open air; the plum and the peach are grown and preserved for exportation; and the caper and the jujube are cultivated. The mulberry is extensively reared; and silk and tobacco are produced in considerable quantities. The woodlands, which cover about 570,000 acres, yield firs equal to those of the north of Europe, cork trees, and the kermès oak. Odoriferous plants, the rose, jasmine, heliotrope, &c., are greatly cultivated for making essences and perfumes. A great number of bees are kept, which produce exquisite honey.

The tunny, anchovy, and sardine fisheries are actively carried on along the coast. The manufactures are—coarse woollen cloth, perfumery, liqueurs, confectionery, olive oil, soap, corks, leather, brandy, silk twist, paper, glass, pottery, and salt of lead. The exports are chiefly wine, fruits, olive oil, and horticultural products.

Divisions, Chief Towns, &c.—The department is divided into three arrondissements, which, with their subdivisions and population, are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1861.
Draguignan, . .	11	60	87,126
Brignoles, . . .	8	54	70,219
Toulon, . . .	8	29	158,181
Total, . .	27	143	315,526

The capital of the arrondissement of Draguignan and of the whole department is DRAGUIGNAN. *Aups*, a small but ancient town, 15 miles N.W. of Draguignan, stands in a plain at the foot of the northern range of mountains, and has 2647 inhabitants. There are ancient ruins near this place, and several Roman milestones are found in the canton. *Callas*, 5 miles N.E. from Draguignan, has 2006 inhabitants. *Fayence*, an ill-built town E. of Callas, stands on high ground, and has a population of 2176, who manufacture oil, pottery, and glass; the church of Notre-Dame here dates from the twelfth century. *Fréjus*, the ancient *Forum Julii*, situated on an eminence about a mile from the sea, and the same distance from the mouth of the Argens, is 14 miles S.E. from Draguignan, and has a population of 2887. This town was a place of importance under the Romans, who greatly embellished it, as the remains of an aqueduct, an amphitheatre, and other buildings testify. The ancient harbour, which was sunk under the walls, communicated with the sea by a canal; and a mass of water brought by a cut from the Argens kept the harbour and its approaches clear of mud. This cut was neglected in after time; the harbour and canal were converted into a marsh, which has been drained, and corn now grows where the Roman galleys once rode at anchor. Fréjus gives title to a bishop. The former episcopal residence, the cathedral, the theological college, and the hospital, are the principal buildings. At the little fishing harbour of *St.-Raphaël*, a mile and a half distant, Napoleon landed from Egypt, October 9, 1799; and here also he embarked for Elba in 1814. *Lorgues*, 7 miles S.W. from Draguignan, near the left bank of the Argens, has a handsome church, woollen-cloth factories, oil and corn mills, tanyards, brick and tile works, brandy distilleries, marble quarries, and 4634 inhabitants. *Le-Luc*, S.W. of Lorgues, has a population of 3759, who manufacture woollen stuffs, corks, oil, brandy, leather, glass and crystals; and trade also in large chestnuts, the produce of the neighbouring woods. *Salernes*, 12 miles W. from Draguignan, on the left bank of the Bresque, a feeder of the Argens, in a fertile and picturesque country, has 3600 inhabitants, who manufacture coarse woollens, pottery, and oil, and trade in wine, figs, silk, cattle, &c. *St.-Tropez*, a small seaport town, 22 miles S. by E. from Draguignan, is built in a pretty situation on the shore of the bay of Grimaud, and has a chamber of commerce, and 3358 inhabitants, who are engaged in the coast fisheries, in shipbuilding, and in the wine and coasting trade. The harbour is well sheltered, and affords safe anchorage.

The arrondissement of Brignoles takes its name from its chief town, *Brignoles*, which is situated on the Calami, in a fertile basin inclosed by wooded hills, 22 miles W. by S. from Draguignan. It has civil and commercial tribunals, a public library, normal school, and 6143 inhabitants; is pretty well built, and contains several squares planted with trees and adorned with fountains. Woollen cloths, soap, glue, wax candles, spun silk, pottery, leather, and brandy, are the chief industrial products; the commerce in these articles, and in wine, liqueurs, olive oil, oranges, and plums, is considerable. *Barjols*, a town of 3330 inhabitants, is situated on the slope of a hill, in a beautiful district, 12 miles N. from Brignoles, and has manufactures of paper, leather, pottery, brandy, and confectionery. *Cotignac*, built at the foot of a hill, 8 miles N.N.E. from Brignoles, has a public library, silk mills, tanyards, some trade in wine, raw silk, figs, and confectionery, for which it is famous; the population amounts to 3516. *St.-Maximin*, situated in a fine

plain, near the source of the Argens, 10 miles W. by N. from Brignoles, is girt with walls, and has 3562 inhabitants, who manufacture woollen and cotton stuffs and brandy. In the immediate neighbourhood are extensive marble quarries. The church, built in this town by Charles II. of Naples and Count of Provence about 1283, is one of the finest religious structures in the department; the wood carvings of the choir and the pulpit may be considered masterpieces of art.

The chief town in the arrondissement of Toulon is TOULON. *Le-Beausset*, distant from it 9 miles N.W., has a population of 2692. *Cuers*, 12 miles N.E., built at the foot of a hill covered with vineyards, olive groves, and fruit trees, has 4311 inhabitants, chiefly engaged in agriculture and making brandy. HYERES. *Ollioules*, 5 miles W. from Toulon, prettily situated at the north-western extremity of a savage and rocky gorge, called Vaux-d'Ollioules, and traversed by the high road, has a population of 3360, who raise vast quantities of fruits. *Solliès-Pont*, 7 miles N.E. from Toulon, on the Gapeau, is a pretty village, with a handsome church, silk mills, tanyards, and 2961 inhabitants, who trade in figs, oranges, citrons, &c.

The department forms the see of the bishop of Fréjus; is included in the jurisdiction of the Imperial Court and Academy of Aix; and belongs to the ninth Military Division, of which Marseilles is head-quarters. It returns two deputies to the Corps Legislatif.

The towns of Antibes, Cannes, Grasse, and Vence, which formerly belonged to this department, are now included in that of ALPES-MARITIMES; but as they have been referred to VAR, we append a short description of each. *Antibes* (*Antipolis*), which is said to have been founded as a Greek colony B.C. 340, is a strongly fortified seaport on the Gulf of Genoa, with 6829 inhabitants. It is surrounded by olive, orange, and vine plantations. The population are chiefly engaged in the fisheries and the coasting trade; the principal articles of their commerce being salt fish, wine, olive oil, oranges, figs, and other dried fruits. The harbour is small but deep, defended by a square fort built on a rock, and formed by a long semicircular jetty, which terminates in a lighthouse, and is bordered by a quay and a range of arcades. The parish church, two high towers, built, it is said, long before the Christian era, and the town-hall, are the most remarkable buildings. *Cannes*, a town of 7357 inhabitants, situated on the slope of a hill above the shore of the Mediterranean, is pretty well built, and has a large quay, but vessels cannot come close to the shore. The vicinity presents many beautiful sites in which the orange and citron flourish; the climate is delicious, and makes the town a favourite winter resort of many English families. The inhabitants distil essences; manufacture soap, olive oil, and perfumery; and export anchovies, fruit, and corn. Napoleon I. landed at Cannes after his flight from Elba on 1st March, 1815. In the neighbourhood was a favourite residence of Lord Brougham. *Grasse*, situated on the slope of a high hill, 23 miles E. from Draguignan, has civil and commercial tribunals, a college, an ecclesiastical school, and 12,015 inhabitants, who manufacture coarse woollens, silk, organzine, linen, thread, liqueurs, brandy, olive oil, soap, leather, and a great quantity of essences and perfumes, particularly those made from orange flowers, roses, mint, &c. There is also a good trade in fruit. The houses of the town are well built; but the streets are steep, crooked, and narrow. In the highest part there is an abundant spring, and the water is conducted by canals to irrigate the environs of the town, which abound in fruit and flower gardens. The principal church, a heavy Gothic building, the great market-place, the hospitals, the public library, which contains 10,000 volumes, the theatre, town-hall, exchange, gallery of paintings, Roman antiquities, and several pretty public walks, are the most noteworthy objects in Grasse. *Vence*, an ill-built walled town, with pretty suburbs, is situated 12 miles N.E. from Grasse, in a well-cultivated district, and with a most delightful climate; it occupies an ancient site, as is proved by its old ruins with inscriptions, and has 2710 inhabitants, who manufacture woollen cloth, leather, and oil. (*Dictionnaire de la France; Annuaire pour l'An* 1868).

VARA, a Spanish measure of length, which, in Castile, is equal to 0·925 of an English yard; and this standard still prevails in those states which belong, or formerly belonged, to Spain. Thus the vara at Havannah is 0·927 of an English yard; in Chili 108 varas make 100 imperial yards; and the Mexican vara is 3 geometrical feet. The solid vara of Spain is 20·361 cubic feet.

VARADES. [LOIRE-INFÉRIEURE.]

VARA'NIDÆ, a family of Lizards belonging to the Platynote or Broad-backed Saurians of MM. Duméril and Bibron. These large lizards are divided by the authors above named into two genera, *Varanus* and *Heloderma*.

Next to the Crocodilians, the Varanians attain the greatest size of any of the Saurians. They are divisible into two distinct groups: the eminently *terrestrial*, whose abode is far from the waters, in desert and sandy places; and the *aquatic group*, consisting of those which inhabit the banks of rivers and lakes.

The first have the tail entirely conical and nearly rounded, and it would appear at first sight to be useless, if not in the animal's way: but as nature makes nothing in vain, Wagler's notion that it acts as a necessary counterpoise to the trunk is probably, so far as it goes, correct. The multitudinous bones which form the tail of the second are very well developed, particularly in their transverse processes, and offer strong points of attachment for the muscles: the upper and lower apophyses are comparatively greatly increased. Compressed throughout its entire length, this tail becomes a powerful organ of motion when the animal is in the water, particularly as it is often surmounted with a crest formed by one or two rows of flattened scales, a fit propelling oar for the body rendered buoyant by the air with which the lungs are filled.

On land the Varanians run with rapidity, but their motion is always serpentine, a mode of progression due to their long tail, which helps to push them forward, and aids them in their leaps upon the prey which they pursue.

Their food consists of animal matters, and especially large insects, such as *Blattæ*, or cockchafers, locusts, crickets, and beetles. It is asserted that they hunt after the eggs of birds and crocodiles, and that chameleons, small tortoises, fish, and other animals, have been found in their stomachs.

Geographical Distribution.—The family, as modified by MM. Duméril and Bibron, exists in all parts of the world, with the exception of Europe. America claims one only, that on which the genus *Heloderma* is founded. In Asia there are four *Varani* properly so called: four in Africa; and four in Oceania. Of these last four, two have been observed in Australia, one in the isles of the Papuans, and the fourth in the Isle of Timor.

Terrestrial Varanians.

MM. Duméril and Bibron notice but two terrestrial species, the *Terrestrial Monitor* of Egypt, *Varanus arenarius* (Dum. and Bib.), and *Varanus Timoriensis* of the same authors. But Dr. Smith has since given a very accurate figure and description of *Varanus albogularis*, the species whose locality was unknown to MM. Duméril and Bibron; and the form of the tail, &c., together with Dr. Smith's account of its habits, leaves little doubt that it ought to come in this section.

Dr. Smith did not obtain any specimens of *V. albogularis* south of Latakoo, but there is, he says, reason to believe that it occasionally occurs within the limits of the Cape Colony; and he adds that it is in all probability the animal which is called *das Adder* by the colonists, and which is so much dreaded from the supposition that it is extremely venomous. 'It is usually,' continues Dr. Smith, 'discovered in rocky precipices, or on low stony hills, and when surprised seeks concealment in the chinks of the former, or in the irregular cavities of the latter; and when any irregularities exist upon the surface of the rocks or stones, it clasps them so firmly with its toes, that it becomes a task of no small difficulty to dislodge it, even though it can be easily reached. Under such circumstances the strength of no man is able to withdraw a full-grown individual: and I have seen two persons required to pull a specimen out of a position it had attained, even with the assistance of a rope fixed in front of its hinder legs. The moment it was dislodged it flew with fury at its enemies, who by flight only saved themselves from being bitten. After it was killed it was discovered that the points of all the nails had been broken previously, or at the moment it lost its hold. It feeds upon frogs, crabs, and small quadrupeds; and from its partiality to the two former, it is often found among rocks near to springs or running streams; which fact having been observed by the natives, has led them to regard it as sacred, and not to be injured without danger of drought.'

Aquatic Varanians.

The Monitor of the Nile, *Varanus Niloticus*, is noticed under Monitor. Another species, *Varanus Bellii*, is a native of Australia.

Heloderma.

Generic Character.—Scales or tubercles of the body simple or not surrounded with small squamous grains. Tail rounded. The fifth toe of the posterior feet inserted on the same line with the other four.

The Heloderms have not the scales or tubercles with which they are covered surrounded by small squamous grains like the Varans. The five toes of each of the posterior feet of the *Helodermata* are inserted on the same transversal line, whereas in the *Varani* the fifth is attached to the tarsus, farther back than the others. The teeth differ too from those of the Varans, for they are not compressed. The tail of the Heloderms is rounded throughout its extent.

Example.—*Heloderma horridum.* Locality, Mexico, where there is an erroneous but general belief that the bite of this species is fatal.

From the *Varanians* we may pass to a brief account of the *Lacertidæ*, or True Lizards.

The *Lacertinidæ*, in Dr. J. E. Gray's arrangement, come immediately after the *Teidæ*, and are followed by the *Zonuridæ*.

Dr. Gray's *Lacertinidæ* consist of the genera *Zootoca*, *Lacerta*, *Teira*, *Eremias*, *Acanthodactylus*, *Scapteira*, *Meroles*, *Mesulina*, *Calrita*, *Algira*, *Psammodromus*, *Ophiops*, and *Calosaura*.

We must here confine ourselves to the genera *Lacerta* and *Zootoca* as examples.

Lacerta, Linn.

Generic Character.—Throat with a distinct collar. Nostrils situated towards the outer and inferior margin of the nasal scuta. An osseous superorbital lamina. Temples covered with scuta. Scales of the back orbiculo-polygonal, slightly carinated. Palate toothed.

Example.—*Lacerta agilis.*

Great confusion has existed touching the identity of this beautiful English species, arising from the application of the term *agilis* by naturalists to the common lizard of their several countries. This has not escaped the acute observation of the prince of Canino and Musignano, who, in his 'Fauna Italica,' clearly defined the true *Lacerta agilis*, or *Lacerta di Linneo.* Mr. Bell, in his elegant work on 'British Reptiles,' followed out the inquiry with great learning and industry, and we shall take our descriptions from his pages.

He describes the *Lacerta agilis* as varying exceedingly in colour and marking. The most common colour of the upper parts is a sandy-brown, with obscure longitudinal fasciæ of a darker brown, and a lateral series of black rounded spots, each marked with a yellowish white dot or line in the centre. There is often in this most common variety more or less of green on the sides. Length from 7 to 8 inches.

Another variety has the upper parts more or less of a green hue. In some this colour is brighter and lighter than in others, but the usual colour is a rather dull brownish-green. The beautiful green *Lacertæ* seen by Gilbert White on the sunny banks near Farnham, were probably of this variety. The prince of Musignano, in his 'Fauna Italica,' figures a variety with the whole of the back of a dull black-red colour. The under side is usually of a whitish or grayish colour, varied with light green towards the sides, about the collar, and under the tail, and a few black dots scattered about those parts.

Locality.—North of Europe, as high as Sweden and Denmark; rare so far south as Italy. Common in the north of France and Central Europe. In England, near Poole.

Habits.—The *Lacerta agilis* is far less easily rendered familiar than the beautiful green lizard (*L. viridis*) of Guernsey and the south of Europe. This latter species may be readily tamed, and taught to come to the hand for its food, and to drink from the hollow of the palm of any one to whom it is accustomed. It will lie coiled up between the two hands, enjoying the warmth, and not offering to escape. But it is very different with the former species, which appears not to be susceptible of any such attachment. It will indeed attempt to bite any one who handles it, which is not the case with the *L. viridis.* When in confinement it ceases to feed, conceals itself with extreme timidity when approached, and ultimately pines and dies.

The number of eggs laid by the female is from twelve to fourteen, in hollows excavated by her for a nest. She covers them with sand, and leaves them to the rays of the sun. They are deposited a long time before they are hatched.

Zootoca, Wagl.

Generic Character.—Nostrils, collar, superorbital lamina, as in the genus *Lacerta.* Temples covered with

plain, near the source of the Argens, 10 miles W. N. from Brignoles, is girt with walls, and has inhabitants, who manufacture woollen and cotton and brandy. In the immediate neighbourhood extensive marble quarries. The church, built in town by Charles II. of Naples and Count of about 1283, is one of the finest religious the department; the wood carvings of the choir and pulpit may be considered masterpieces of art.

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…fers in different …defined, and the …one amongst the …cies is composed. …d to express them. …,' gives the defini… …ards describes the …always spoken of as …*ra*, the character of …Many writers give an …ich is attached to that …of *Euphorbia lucida* …*ifolia*, *E. l. salicifolia*, …

…many changes by culti… …frequently resorted to: …*ica rapa*, the common …sub-species, *B. r. oleifera* …of these has several varieties, …*annua*, and *B. r. r. longa*, …these varieties has again been …the colour of the roots, forming …and red sub-varieties.

…of plants are by no means so …arise from cultivation. Almost …in our kitchen and fruit gardens …property in plants which they …natural state, and this is mostly …sponding change of structure. …are produced by cultivation …Crab (*Pyrus malus*), all the pears …: the cherries from *Prunus* …, and nectarines, from *Amyg*… …plums from the *Prunus domestica*. …vegetables; the varieties of cab… …by cultivation from the same species: …potatoes, radishes, &c. Such, too, …the great majority of tulips, …ranunculi, &c., found in gardens are …characters dependent on cultivation. …present work on 'The Origin of Species' …much more attention has been given, …and botanists, to the value of the …systematic natural science. Even …widely from this great naturalist's …that very many forms, which are now …no more than well-marked *per*…

…E, was born at Caen in 1654. …designed him for the church, …of his native town. He …as well as his father's work… …him a longing to …are constructed, …gratify until, by …teller's shop. …of Descartes, …became well …among his …

for many years, and enabled him to pursue his studies; the two friends went to Paris in 1686, took up their quarters in the same house, and pursued their several researches. It was here that Fontenelle, who was also of Normandy, became acquainted with them, and he describes Varignon as the most laborious of students; glad to go on with what he was doing at two o'clock in the morning, under the pretext of its not being worth while to go to bed, because he usually rose at four. In 1687 his first work, the 'Projet d'une Nouvelle Mécanique,' a most remarkable treatise, being in fact the first in which the great elementary principle of the composition of forces is made the basis of a systematic development of statics, brought him at once into such reputation, that he was in the following year elected to the Academy, and appointed professor of mathematics at the Collège Mazarin; in 1690 appeared the 'Nouvelles Conjectures sur la Pesanteur.' By 1705 he had ruined his health: he was for six months in danger, and for three years in a state of debility. He died December 22, 1722, without illness, having performed his usual duties at the college the day before.

Besides his two separate works, he printed a great deal in the Memoirs of the Academy of Sciences, particularly in defence of the new doctrines of the infinitesimal calculus. His name is familiar to all who have even glanced at the history of this theory, as the explainer of its difficulties in answer to the earnest and frequently plausible attacks which were made upon it.

VARI'NAS, or BARI'NAS, the chief town of the province of Barinas, in the republic of Venezuela, lies near 7° 30′ N. lat. and 70° 12′ W. long., at the base of the Nevado de Mérida, an offshoot of the Andes, and on the north-western edge of the great plain of the basin of the Orinoco, 90 miles S. of Truxillo. The inhabitants of the mountains bring to this place their corn and fruit, and take in exchange the produce of the numerous herds of cattle which pasture on the plains. The country which surrounds the town is very fertile, and especially fit for the cultivation of tobacco, which forms the staple article of its commerce, and is sent to Europe by way of Angostura. The river St. Domingo, an affluent of the Apure, which rises on the declivities of the Nevado de Mérida, and passes through Barinas, becomes navigable at Torruno about 14 miles below; so that the latter may be considered as the port of Barinas, from which its exports are sent down the St. Domingo, the Apure, and the Orinoco to Angostura. The population is about 4000.

VARIOLA. [SMALL-POX.]

VARIOLA'RIA, a genus of plants, belonging to the natural order of Lichens.

V. fagínea, the Bitter-zoned Variolaria, is one of the species included in the *Lichen fagineus* of Linnæus. It is common on the bark of trees, especially of old beech trees and on pales. This species is distinguished from all others of the genus, a… …s of the order, by its intensely bitter taste. …, Milky-white Variolaria, is the *Lichen* … Linnæus. It occurs on rocks in mountainou… …. This is a very elegant species of the gen… …*ulifera*, Vesicle-fruited Variolaria, is foun… …, growing on the bark of old oaks and be… …it was gathered by Dr. Sibthorp in Greec… …count of the form of the productive orga… …st remarkable-looking species of the ge… …, Leprous Variolaria, common on o… …gate-posts, giving them …perfectly daubed over

adpressed sacks. Scales of the back elongated and hexagonal. Palate toothless.

Example.—*Zootoca vivipara.* Smaller and more slender than *L. agilis.* Common on our sunny banks and hedgerows. Abundant in France, Italy, Germany, Switzerland, and Russia. It is one of the few reptiles found in Ireland. Its movements are beautiful, gracile, as well as rapid: it comes out of its hiding-place during the warm parts of the day, from the early spring till autumn has far advanced, basking in the sun, turning its head with a sudden motion the instant that an insect comes within its view, and darting like lightning upon its prey, it seizes it with its little sharp teeth and speedily swallows it. Thus it will often take a great number of the smaller insects, preferring those of the Dipterous order, though it will not refuse many of the Coleoptera or Orthoptera, if they be not too large.

Instead of depositing her eggs in the sand to be hatched by the warmth of the sun, as is the case with the former, the female of the present species retains the eggs within the oviduct until the young are ready to leave them, and they are produced alive. As in all the ovo-viviparous reptiles, the covering of the egg is very thin, and merely membranous. In this respect they differ from those which deposit their eggs before the embryo is formed. In the latter case a more efficient protection is necessary, and the covering is either calcareous, as in the tortoises and crocodiles, or of a substance resembling parchment, as those of the snakes and most lizards. In the viper, which also produces its young alive, the covering, as in the present animal, is extremely thin, and very easily torn; and there is reason to believe that the laceration of this membrane and the emancipation of the young take place in, and are occasioned by, the very act of parturition.

As the young ones are occasionally found with the mother, there is reason to believe that these little animals are not wholly devoid of the instinct of parental care and tendance; but it is scarcely probable that the feeling is ever very powerful, or that it endures for any considerable period. The young when brought forth are fully formed, and capable of running about, and very shortly afterwards of taking their own food. The usual number is from three to six. [LACERTIDÆ.]

VAREC, an impure carbonate of soda, made in Brittany, corresponding to the kelp of the British Islands.

VARENNES-EN-ARGONNE. [MEUSE.]

VARESE. [COMO.]

VARIATION OF THE COMPASS (or of THE NEEDLE), frequently called the Declination of the Needle, is the angle which a vertical plane passing through the axis of a magnetized needle makes with the geographical meridian of a ship or station; and as, for the purposes of navigation, the needle is made to traverse horizontally, the variation becomes the angle between the magnetic axis of the needle and a meridian line passing parallel to the horizon through the centre of the compass.

When the variation of the needle was first distinctly ascertained in London, by Norman and Burroughs, in the year 1580, it was found that the magnetic axis deviated from a true meridian line as much as 11° 15′, its north point being directed so far towards the east; and in a few years from that time it was discovered that the angle of deviation was slowly diminishing. In the year 1657 the needle appeared to lie in the direction of the geographical meridian of London; and from that time to the year 1820 its northern extremity continued to advance towards the west. A mean of the observations between the years 1814 and 1820 shows that the deviation was then about 24° 18′. Subsequent observations have proved that the western declination had then attained its maximum value, and that the needle is now returning towards the geographical meridian. Like deviations have been observed in other parts of the world. The general opinion is, therefore, that the needle performs a series of oscillations on each side of the meridian, and after attaining its extreme limit, returns again through another slow oscillation. No easterly declination equal in quantity to the westerly maximum has been observed with care, and we are therefore left to conjecture only on this point. As the declination was 0 in 1657, and 24° 18′ in 1818, it may be expected to be 0 again in 1979, and attain its greatest easterly value in 2140. (Sir David Brewster, *Treatise on Magnetism.*)

VARICELLA, or *Varicella lymphatica*, is the eruptive disease commonly called Chicken Pox, and which has been described by different writers under the names of crystalli, variolæ pusillæ, variolæ spuriæ, &c. It is almost peculiar to infants and young children; and the eruption appears either without premonitory signs, or after two or three days of slight illness. The eruption commences on the shoulders, neck, and breast: on the scalp and back it is usually abundant, but the face is only slightly affected. It consists of vesicles, about as large as a split pea, full of transparent fluid, and lenticular, conoid, or globular in their form. They are surrounded by a slight superficial redness, and successive crops of them appear for two or three days, the old vesicles shrivelling up as the new ones are formed. Most of the vesicles burst naturally, and the cuticle which covered them falls to the level of the surrounding skin; but some shrink, the fluid within them becoming whey-like, or, if they be much irritated, purulent. After drying they form small scabs, which fall off in grains, and sometimes leave small superficial scars. The whole course of the disease occupies about a week, and is not attended by any important constitutional disturbance. It therefore requires no particular treatment.

VARICOCELE (from the Lat. *varix*, 'a swollen vein,' and the Gr. κήλη, 'a tumour'), in Medicine, a term applied to the swelling of the veins of the spermatic cord.

VARICOSE VEINS. [VEINS, DISEASES OF.]

VARIETIES, in Botany, are groups of individual plants subordinate to species. The character of the species is found in its capability of reproducing by seed a plant which is more like itself than it is like anything else; and this under all circumstances in which the offspring is capable of being produced. The variety differs from the species in points of structure which are developed only under certain circumstances, and which are not essential to the species. This may be illustrated by an example—as for instance, the common apple (*Pyrus malus*). If the seeds of the wild apple, or any of the cultivated varieties of apples, are sown under any circumstances, the plants that spring from these seeds will, in the great mass of their characters, be more like all other apple-trees than they will be like pear, plum, or any other trees. This then illustrates the idea of a species. If, on the other hand, the seeds of some of the sorts of apples, known under the names of Golden Pippin, Nonpareil, &c., be sown under different circumstances from that in which the plant from which they are taken was grown, the plants produced will differ in many respects from their parent in the characters that constitute the variety, but not in those of the species.

In botanical works considerable difference exists in recording varieties and species, as it is difficult, where the history of a plant cannot be traced, to draw a distinction between the permanent character of the former and the variable character of the latter.

The mode of recording varieties differs in different writers. In some cases the species is defined, and the description is regarded as indicating one amongst the groups of varieties of which that species is composed. The Greek alphabet is frequently used to express them. Thus Hooker, in the 'British Flora,' gives the definition of *Rosa inodora*, and afterwards describes the varieties as β and γ, and they are always spoken of as varieties α, β, and γ of *Rosa inodora*, the character of the species constituting variety α. Many writers give an additional name to the variety which is attached to that of the species. Thus the varieties of *Euphorbia lucida* are written *Euphorbia lucida latifolia*, *E. l. salicifolia*, *E. l. linearifolia*.

Where plants have undergone many changes by cultivation, further subdivisions are frequently resorted to: thus by some writers *Brassica rapa*, the common Turnip, is described in two sub-species, *B. r. oleifera* and *B. r. rapifera*; each of these has several varieties, as *B. r. o. biennis*, and *B. r. o. annua*, and *B. r. r. longa*, *B. r. r. rotunda*. Each of these varieties has again been subdivided, according to the colour of the roots, forming white, yellow, green, and red sub-varieties.

The *natural* varieties of plants are by no means so numerous as those which arise from cultivation. Almost the entire object in view in our kitchen and fruit gardens is the development of some property in plants which they do not exhibit in their natural state, and this is mostly attended with a corresponding change of structure. All the varieties of apples are produced by cultivation from the common Crab (*Pyrus malus*), all the pears from *Pyrus communis*; the cherries from *Prunus cerasus*; peaches, apricots, and nectarines, from *Amygdalus Persica*; and plums from the *Prunus domestica*. The same is true of vegetables; the varieties of cabbages are produced by cultivation from the same species: so also with turnips, potatoes, radishes, &c. Such, too, is the case with flowers: the great majority of tulips, roses, anemones, ranunculi, &c., found in gardens are the result of changed characters dependent on cultivation. Since Mr. Darwin's recent work on 'The Origin of Species' was published, much more attention has been given, both by zoologists and botanists, to the value of the term 'variety' in systematic natural science. Even those who differ most widely from this great naturalist's conclusions, admit that very many forms, which are now regarded as species, are no more than well-marked *permanent varieties*.

VARIGNON, PIERRE, was born at Caen in 1654. His father, an architect, designed him for the church, and placed him at the college of his native town. He learned to make a sun-dial as well as his father's workmen could teach him, and this gave him a longing to know the principles on which such objects are constructed, which he never found the way to gratify until, by accident, he met with a Euclid in a bookseller's shop. From this he advanced to the writings of Descartes, much against the wishes of his friends, and became well versed in the mathematics of the day. Among his college friends was the Abbé de St. Pierre (not Bernardin, the author of the 'Studies of Nature,' but Charles), whose regard for Varignon induced him to make over to the latter 300 francs a year out of 1800, which was his patrimonial fortune. This was his sole provision for many years, and enabled him to pursue his studies; the two friends went to Paris in 1686, took up their quarters in the same house, and pursued their several researches. It was here that Fontenelle, who was also of Normandy, became acquainted with them, and he describes Varignon as the most laborious of students; glad to go on with what he was doing at two o'clock in the morning, under the pretext of its not being worth while to go to bed, because he usually rose at four. In 1687 his first work, the 'Projet d'une Nouvelle Mécanique,' a most remarkable treatise, being in fact the first in which the great elementary principle of the composition of forces is made the basis of a systematic development of statics, brought him at once into such reputation, that he was in the following year elected to the Academy, and appointed professor of mathematics at the Collège Mazarin; in 1690 appeared the 'Nouvelles Conjectures sur la Pesanteur.' By 1705 he had ruined his health: he was for six months in danger, and for three years in a state of debility. He died December 22, 1722, without illness, having performed his usual duties at the college the day before.

Besides his two separate works, he printed a great deal in the Memoirs of the Academy of Sciences, particularly in defence of the new doctrines of the infinitesimal calculus. His name is familiar to all who have even glanced at the history of this theory, as the explainer of its difficulties in answer to the earnest and frequently plausible attacks which were made upon it.

VARI'NAS, or BARI'NAS, the chief town of the province of Barinas, in the republic of Venezuela, lies near 7° 30′ N. lat. and 70° 12′ W. long., at the base of the Nevado de Mérida, an offshoot of the Andes, and on the north-western edge of the great plain of the basin of the Orinoco, 90 miles S. of Truxillo. The inhabitants of the mountains bring to this place their corn and fruit, and take in exchange the produce of the numerous herds of cattle which pasture on the plains. The country which surrounds the town is very fertile, and especially fit for the cultivation of tobacco, which forms the staple article of its commerce, and is sent to Europe by way of Angostura. The river St. Domingo, an affluent of the Apure, which rises on the declivities of the Nevado de Mérida, and passes through Barinas, becomes navigable at Toruno about 14 miles below; so that the latter may be considered as the port of Barinas, from which its exports are sent down the St. Domingo, the Apure, and the Orinoco to Angostura. The population is about 4000.

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VARIORUM editions of the Greek and Roman classics (*Editiones cum notis Variorum*) are those in which the notes of numerous commentators are inserted. Such editions were published chiefly in Holland in the seventeenth and eighteenth centuries.

VARNA, a strongly fortified seaport of European Turkey, is situated on the N.W. extremity of a fine bay in the Black Sea, 47 miles E. of Shumla, and 180 miles N.N.W. of Constantinople. It is surrounded by a stone wall, 10 feet high, which is loop-holed, and defended by several forts and other outworks—the batteries towards the sea being mounted with very heavy cannon. The bay is formed by two rocky promontories; and though open to the E. and S.E. it affords good anchorage, being sheltered on the N. and N.E., from which blow the most dangerous winds of the Black Sea. At its S. entrance is a lighthouse, 164 feet high, in lat. 43° 10′ N., long. 27°58′ E. The streets of Varna are crooked and irregular; and the town is altogether wretchedly built. The only public edifices of any note are a few mosques, with tall minarets. The houses, which are mostly of wood, are of different colours, with red tiled roofs. Lake Denna (12 miles long, and from 1 to 3 miles wide) lies to the W., and extends through the marsh land towards Shumla. By means of a navigable cut to the bay, and other improvements, this lake might be made one of the best harbours in the Black Sea. Varna has regular steam communication with Constantinople, Kustendje, and the ports on the Black Sea and the Danube; and a railway, 120 miles long, between it and Rustchuk, one of the latter, was opened in 1866. This line forms an important link in speedy transit from London to Constantinople, and will open out the immense cereal resources of Bulgaria, the agricultural wealth of which may be developed to a marvellous extent. The latest report of the British consul at Varna states that, in the preceding year 621 vessels (principally coasting steamers), carrying 170,000 tons, entered the port; and that fifty-seven of these were English. The total value of the exports during the same period was 702,704*l.*; and of the imports 927,818*l.*—including 431,018*l.* in specie. This amount, which was below the average, was exclusively employed in the purchase of grain, the trade in that commodity being of the first importance, and steadily increasing. Indeed soft and hard wheats, Indian corn, barley, &c., comprise nearly all the exports; the principal imports, after specie, are French and English cotton and woollen manufactures (purchased at Constantinople), coffee, sugar, oil, &c. The harbour has been greatly improved during the last few years. The population of the town is about 25,000, composed of native Bulgarians, Turks, and foreign traders. The Hungarian army of Ladislas and John Hunyades was totally defeated near Varna by the Turks under Amurath II., November 10, 1444. It was taken by the Russians in 1828. A great fire, supposed to have been the work of an incendiary, on August 10, 1854, destroyed about one-fourth of the houses, and vast quantities of military stores prepared for the expedition to the Crimea—the allied French and British troops having been encamped here for some time in that year, previous to their departure for Sebastopol. In 1864 hundreds of Circassian exiles who had been driven from their homes and landed at Varna, died of starvation.

VARNISH. According to Sir George Cornewall Lewis the word had the following origin ('Astronomy of the Ancients,' c. iii. s. 14):—When Ptolemy Euergetes, king of Egypt, returned from his Syrian expedition in B.C. 243, his Queen Berenice dedicated a lock of her hair in the temple of Aphrodite at Zephyrium. This lock having been surreptitiously removed from the temple, was declared by the priests to have been conveyed to heaven as a constellation, which still bears the name of Coma Berenices; and the amber colour of the royal tress has been commemorated in the word vernish, vernis, or varnish. Other authorities, however, regard it as a modification of *burnish*.

Varnish is a thin fluid which, when spread over a solid surface and allowed to dry, forms a crust or coating impervious to air and moisture, and presenting a more or less brilliant polish. It is made by the solution of some resinous material in alcohol, oil, or any other appropriate solvent, care being taken that it shall be thin enough to work easily, and yet thick enough to protect the surface to which it is supplied.

There are two kinds of varnish, viz., spirit and oil varnishes: in the former methylated spirit is used, in the latter fixed and volatile oils, or mixtures of the two. The solid materials dissolved in these, and constituting the *body* of the varnish, are very numerous, but the principal are as follows:—

Solids.

Amber.	Sandarach.	Elmir.
Animè.	Mastic.	Benzoin.
Copal.	Damar.	Colophony.
Lac.	Common Resin.	Arcanson.

Solvents.

Oil of Nuts.	Alcohol.
" Linseed.	Ether.
" Turpentine.	Wood Naphtha, or
" Rosemary.	Pyroligneous Ether.

Colours.

Gamboge.	Saffron.	Red Saunders
Dragon's Blood.	Turmeric.	Cochineal.
Aloes.	Annotto.	Indigo.

Amber is much esteemed on account of its durability and hardness; but it is costly, takes a long time to dry, and is difficult of transparent solution.

Animè, which is imported from the East Indies, is almost as insoluble and hard as amber, but not so tough. The varnish made with it dries quickly, but is liable to crack, and the colour deepens by exposure to air and light. It is much used in oil varnishes.

Copal, the produce of the *Hymenæa verrucosa*, and *Vateria Indica*, is produced in India, America, the West Indies, Sierra Leone, &c. It is transparent, inodorous, and tasteless. The finest and palest quality is used as body gum; the next best form carriage gum. Oil of rosemary is said to be one of its best solvents; ether is also extensively used; and some persons recommend oil of spruce and oil of lavender.

Lac and *Sandarach* form the bases of spirit varnishes, and readily dissolve in spirit of wine or wood naphtha. They are used for cabinet and painted works not exposed to the weather. Lac is harder than sandarach, but its reddish brown colour is an objection. Sandarach may be hardened by the addition of shell lac or of mastic, and when required to be polished, Venetian turpentine is added to give it body.

Mastic is a soft resin, yielding a brilliant, hard, colourless varnish, which flows better on the surface than most other varnishes. It is much used for pictures and for delicate work generally.

Damar is softer than mastic. Mixed with turpentine it forms an almost colourless varnish; mixed with mastic

it supplies a varnish well adapted for maps and similar purposes.

Common resin, dissolved with the assistance of heat in linseed oil or turpentine, makes a hard, brilliant, bitter varnish, which is employed for common purposes, as in house painting, toys, and cabinet work.

Gamboge is used for yellow, and *Dragon's blood* for red varnishes. These, together with annotto, turmeric, and saffron, are employed to cover brass and copper, under the name of lacquers. In black oil varnishes the varieties of asphaltum are indispensable, and caoutchouc is invaluable when flexibility and elasticity are required, while it is desirable to render the materials air and water tight.

The linseed oil used as the vehicle for the harder resins should be pale, pure, well clarified, and combined with the resin at the lowest possible temperature. Turpentine is in extensive use for varnishes; it should be of the best quality, clear and limpid, and is greatly improved by age. Turpentine varnishes are cheap and flexible, bear an excellent polish, and dry quickly. Spirit varnishes, however, dry much more rapidly, are harder, and more brilliant.

Varnishes are applied to flat surfaces with soft clean brushes, and for spirit varnishes camel's hair pencils and brushes are used. The varnish should be applied in very thin coats, and sufficient time must be allowed between the two coats for the solvent to evaporate. Spirit varnishes require two or three hours between each coat, turpentine varnishes six or eight, and oil varnishes twenty-four hours, but much will depend upon the state of the atmosphere, which should be dry and moderately warm, or at a temperature of about 72°.

Varnish containing any quantity of alcohol, or spirit, is charged 12*s.* per gallon customs duty on importation. In 1866, 528 gallons of this sort, value 286*l.*, were imported into the United Kingdom, in addition to 491*l.* worth of varnish not containing spirit. In the same year 10 gallons, value 5*l.*, of the former and 17*l.* worth of the latter were exported.

(For further information the reader is referred to Holtzapffel, *Mechanical Manipulation*, vol. iii.)

VARRO, MARCUS TERE'NTIUS, was born at Rome B.C. 116, and descended from an ancient senatorial family. He was instructed by L. Ælius, who is spoken of as a most distinguished person, and afterwards by Antiochus, an Academic philosopher. In B.C. 67 he was at the head of a division of the fleet of Pompeius the Great in his war against the pirates. During the civil war between Cæsar and Pompeius, he held the western part of Spain for the latter. When his colleagues had been compelled to surrender, he also surrendered in the neighbourhood of Córduba, and after being set at liberty he repaired to Pompeius at Dyrrachium, where he was staying at the time of the battle of Pharsálus. During the absence of Cæsar in Egypt, B.C. 47, M. Antonius destroyed Varro's villa near Casinum, together with a great part of his property. After the defeat of Pompeius, Varro withdrew from public life; and when Cæsar came to Rome was reconciled to the dictator, who intrusted him with the purchase of the books for and the whole management of the Greek and Latin libraries, which were then established at Rome. Cæsar was murdered in B.C. 44, and Varro, then a man of upwards of seventy years of age, was placed by M. Antonius on the list of the enemies whom he proscribed. His friends concealed and protected him until the danger had passed over, but his libraries were irrecoverably lost. After the battle of Actium, B.C. 30, he again lived at Rome, and appears to have been esteemed by Augustus, who gave him the superintendence of the library founded by Asinius Pollio. In his eighty-eighth year he was still engaged in authorship. (Pliny, 'Hist. Nat.,' xxix. 18.) He died in the ninetieth (B.C. 27), or, according to Valerius Maximus, in the hundredth year of his age.

Varro was the most erudite of the Romans, and one of the most learned men that have ever lived. With all the literature of his time he was thoroughly familiar. His works were very numerous. Of his 'De Lingua Latina,' originally in twenty-four books, only six remain, and these are in a mutilated state. It was dedicated to M. Tullius Cicero. If not very valuable as a treatise on the Latin language, it is useful for the remarks which are interspersed. The best edition is by C. O. Müller, Leipzig, 1833, 8vo. The Bipont edition (1788, 2 vols. 8vo) contains also a collection of the fragments of Varro's lost works.

The 'De Re Rustica,' in three books, is complete, and the text in a better state than that of the treatise 'De Lingua Latina.' Though written when Varro was eighty years of age, its style is pleasing and lively. Besides treating of agriculture, it contains much curious matter on other subjects. It is printed in the collection of the 'Scriptores Rei Rusticæ,' by J. M. Gessner, and in that of J. G. Schneider.

VASA, GUSTAVUS. [Gustavus Erickson.]

VASA'RI, GIO'RGIO, born at Arezzo in 1512, was a painter and architect, but his reputation now rests nearly exclusively upon his 'Vite de' più excellenti Pittori, Scultori, e Architetti,' first published in Florence in 1550, in 2 vols. 8vo. Many editions of the work have been since published, and an English translation is included in Bohn's Library.

The last life in Vasari's work is his own, which he traces up to his fifty-fifth year. He was instructed in design by his father Antonio, and in painting by several masters, including Michel Angelo, at Arezzo, Florence, and Pisa. He entered the service of Cardinal Ippolito de' Medici, who took him to Rome, and introduced him to Clement VII. Afterwards he returned to Florence, where he met with all the success he could desire; but his paintings are not remarkable for any particular excellence. He died at Florence in 1574.

VASCULARES, in Botany, is a term applied to the two principal classes of plants, Exogens and Endogens, on account of their highly-developed vascular tissues, in opposition to the class of Acrogens, the tissues of which are principally cellular, and hence they are called Cellulares.

VASES (Lat. *vas;* Ger. *fass*). This word in its widest sense comprises all vessels intended to contain fluids, whether they are made of metal, stone, or clay; but we treat here of those which have come down to us from remote antiquity, and are remarkable for their qualities as works of art, both in form and in decoration. The most numerous class are those painted vases of dried or baked clay, which have of late years been discovered by thousands in Etruria, southern Italy, Sicily, Greece, and some of the Grecian islands. Such vases are frequently found in tombs, catacombs, and other depositories of the dead. The period during which the art of vase-painting completed its development from the rudest elements to the highest perfection, is comprised in the three centuries before the Christian era, from B.C. 500 to about 200.

Various attempts have been made to classify the immense number of ancient vases, of which specimens are preserved in all the museums of Europe. The most

convenient criterion for such classification is their style of painting, which alone affords a very obvious distinction, and also marks the different stages of the art, though the rule is not infallible, as it is probable that in some cases a very ancient style was imitated at a later period. With this caution we may divide all painted vases into five great classes:—

1. Vases with paintings in the *Egyptian style*.—This name is not meant to imply that they were made in Egypt or by Egyptians, but merely that their style of painting resembles that on the monuments of Egypt. The characteristics by which vases of this class are easily distinguished are as follows:—The vases are of a pale yellow colour, on which the figures, generally of animals or flowers, are painted in a black or brown colour, sometimes with the addition of purple or white tints. Grace is entirely wanting. Some critics have imagined that some of the vases of this class may be as old as the time of Homer, but the best antiquaries are agreed that most of them are not older than the year B.C. 500. They occur most frequently in the tombs of Volsci in Etruria, and in those of Nola.

2. Vases with paintings in the *archaic* or *ancient style*.—These have black figures on a red ground, and the figures are no longer mere animals and ornaments of the vessels, but contain scenes taken from the stories about the gods and heroes of Greece, and from the occurrences of ordinary life. The form, which is usually that of the amphora, has a freedom and elegance of proportions which are wanting in those of the first class; and they vary greatly in size. The peculiarities of the designs are strong outlines of the main parts of the human body, and the expression of the highest degree of physical strength. In the representation of animals, especially horses, there is sometimes a considerable degree of boldness and beauty. The majority of vases of this class are generally believed to have been made previous to the year B.C. 430.

3. Vases with paintings in *the severe style*.—In these vases the figures are red, the natural colour of the clay, on a beautiful black ground. The most striking features in the designs are a certain moderation and harmony. The drapery forms varied and rich folds, though they show a conventional regularity. The heads are worked with great care, and sometimes are truly graceful; the hands and feet are better drawn than on the vases of the former classes. The subjects represented are the same as those on the vases of the second class, but repose is more frequent than action. The forms are elegant, and they present great variations both in shape and size. They occur most frequently in Etruria and at Nola. This class is commonly assigned to the period from B.C. 460 to 420.

4. Vases with paintings in *the beautiful style*.—In the vases which are regarded as the true representatives of this period, all harshness and severity of style have disappeared: liveliness in the composition, perfect freedom in action and movement, as well as in the drapery, are the essential characteristics. The colour of the figures, as in the third class, is the natural red of the clay, and white is used to represent a variety of things, such as ribbons, garlands, the flames of torches, and the like. The inscriptions, too, are usually painted in white. Vases of this class are not often found in Etruria: they are most frequent in Nola, Sicily, and Attica. Those which exhibit the very highest perfection of the art appear to belong to the period beginning with the year B.C. 400.

5. Vases with paintings in *the rich style*.—These differ but little from the preceding, and are often difficult to assign with certainty. The designs are frequently executed with considerable carelessness, and show the sinking condition of the art. The best specimens are of extraordinary beauty, but the worst are so bad that they can scarcely be regarded as the works of the Greeks.

There is a large collection of these vases, including all the classes, in the British Museum; and a number of works have been written on the various curious questions as to their uses, origin, and processes of manufacture. Among the more valuable of these, we may mention Kramer's 'Uber den Styl und die Herkunft der bemahlten Griechischen Thöngefässe,' Berlin, 8vo.

We cannot here enter into a description of the mechanical process of making paintings on vases, which has been the subject of much discussion in modern times, but must refer the reader to an able treatise on this point by Hausmann, 'Commentatio de Confectione Vasorum Antiquorum Fictilium, quæ vulgo Etrusca appellantur,' Gottingen, 4to.

VASSAL. [FEUDAL SYSTEM.]

VASSY. [MARNE, HAUTE.]

VATE'RIA, a genus of plants of the natural family of *Dipterocarpeæ*. The species are only two in number, *V. Indica*, which grows all along the Malabar coast and in Canara, and *V. lanceæfolia*, which is common in Silhet. Both species form large trees. *V. Indica* grows to the height of about 60 feet, and yields valuable timber, which is much employed in shipbuilding, and is not liable to be attacked by the teredo. When the bark is wounded, a pellucid, fragrant, acrid, bitter, resinous fluid exudes, which in the rays of the sun becomes yellow and fragile like glass. This resin is well known in commerce, and is usually called Copal in India, but when imported into England receives the name of gum animè. The fluid resin also makes a good varnish. Another very valuable product is yielded by this tree, and that is a fatty substance known by the name of the Piney Tallow, or Vegetable Tallow of Canara. It is obtained by boiling the seeds, when the fatty substance floats to the surface, and on cooling down becomes of the consistence of tallow. In colour the different specimens vary from pale yellow or fawn to perfect white. Its general properties, such as its hardness, colour, combustibility, and fusibility, place it between wax and tallow; but it is far superior to the latter, having no disagreeable smell, either when burning or at common temperatures.

VATICAN, or *Il Borgo*, is the name of a division of modern Rome, on the right bank of the Tiber. [ROME.] The Mons Vaticanus was outside the walls of the ancient city. In the plain between the hill and the Tiber Caligula constructed a circus for chariot races, and placed an obelisk in its centre, the same which now stands before St. Peter's Church. The circus was destroyed under Constantine, who built on its site a church, or basilica, dedicated to the Apostle Peter, whom tradition reported to have been buried on that spot. In the year 1146 Eugenius III. began building a palace near the church of St. Peter for the papal residence, which grew by degrees into an immense mass of buildings, known by the general name of the Vatican. Gregory XI., on his return from Avignon, fixed his permanent residence here on account of the protection afforded by the neighbouring castle of St. Angelo. It continued to be the residence of the popes until about the middle of the sixteenth century, when Paul III. built the palace on the Quirinal Mount. It is still

used, however, on the occasion of grand church ceremonies being performed in St. Peter's.

The old church of St. Peter was a large structure, more than 300 feet in length: it lay lower than the present church, which has been raised above it, and is much larger. Part of the ancient church is become a subterraneous vault under the pavement of the modern building: it contains chapels and altars, with old monuments, sculptures, and mosaics; and the public have access to it on certain days only.

Nicholas V. was the first who, about the year 1450, thought of building a new church, but the undertaking was abandoned for about half a century, until Julius II. commissioned the architect Bramante to make a plan of the intended structure. His idea was a Latin cross, surmounted by a vast and lofty dome. Julius II. himself laid the first stone on the 18th of April, 1506. Bramante, Giulio di San Gallo, Raphael d'Urbino, Peruzzi, Michel Angelo, Barozzi or Vignola, Domenico Fontana, Giacomo della Porta, Carlo Maderno, Fontana, and Bernini, were successively employed on the church and its surrounding accessories, including the Piazza, the fountains, &c.

Such a building as St. Peter's, carried on under so many different hands, and upon different plans, for a period of more than a century, must have faults and incongruities. The portico in front is mostly objected to, as not corresponding to, and spoiling the view of, the church itself. But with all its faults, St. Peter's as a whole may be safely said to be the most magnificent structure raised by man. Its interior well corresponds with its external appearance: the proportions are so well kept, that the eye, at first, is not struck with the vastness of the edifice, until moving on we examine some of the parts separately. Many large and expensive works have been published, describing the building and its gorgeous altars, chapels, sculptures, paintings, &c. The best are by Fontana, Cancellieri, and Poleni.

The assemblage of buildings called by the name of the Vatican, and which extends in an oblong irregular mass north of the church as far as the town walls, consists mainly of—1, the Papal Palace; 2, the court and garden of Belvidere; 3, the Library; 4, the Museum. The total number of apartments is computed at 4422. The Papal Palace contains, among other remarkable objects, the Sistine Chapel and Pauline Chapel, both painted by Michel Angelo. The Sistine Chapel contains the painting of the Last Judgment; the four 'stanze,' or apartments, painted by Raphael; and the 'logge,' or open galleries, painted by Raphael's pupils, under his direction. A corridor, about 1000 feet long, joins the Papal Palace to the building called Belvidere, which serves as a museum. About half way up this corridor is the entrance to the Vatican Library, which was built by the architect Fontana, under Sixtus V. It is the richest in Europe in MSS. The museum, or collection of works of art, mostly of ancient sculpture, founded by Pius VI., is the richest of its kind in Europe.

VATTEL, EMMERICH, was born at Couret, in the principality of Neufchatel, in 1714. He was sent to the University of Bas to study the classics and philosophy; and finally he repaired to Geneva, to study theology. But the writings of Leibnitz and Wolff had more attractions for him than the 'Institutes' of Calvin. In 1741 he proceeded to Berlin, in the hope that the court of Frederick II., who had recently ascended the throne of Prussia, and whose taste for literature was general, might afford a field for his talents. In 1742 he published a defence of Leibnitz' system, which he dedicated to Frederick. His wish was to enter the diplomatic service of Prussia, but no vacancies occurred; and in 1744-45 he entered the service of the king of Poland and elector of Saxony. In 1746 he was sent to Berne as the Polish ambassador to that republic. His duties were small, and he had leisure for literary pursuits, and to labour on the work by which his name is now chiefly known, his 'Droit des Gens,' or 'Law of Nations.' The first edition of this work was published at Neufchatel in 1758, but the title-page bears the fictitious place of publication, 'Londres.' About this time he was recalled to Dresden and made a privy councillor. He died 28th December, 1767.

His 'Droit des Gens' shows no very great acquaintance with treaties, or even with political history. His principal authorities are Grotius, Puffendorf, and Wolff. It has had a great reputation, and has passed through many editions. Its merits, such as they are, consist in its arrangement, and its being written in an easy style. The matter is rather vague, and it would require a very skilful hand to put it into the best practical shape. There is an English edition of Vattel, which Mr. Chitty republished with notes, in 1833.

VAUBAN, SEBASTIEN LE PRESTRE DE, Marshal of France, one of the most illustrious of military engineers, was born May 1, 1633, at St. Leger de Fougeret, near Saulieu, in Burgundy. At the age of seventeen he entered the regiment of Condé, which was then in the service of Spain. His good conduct soon procured him a commission; and the experience acquired in the field, with a knowledge of trigonometry and mensuration, qualified him for the duties of an engineer.

He had already gained considerable distinction by his gallantry and abilities, when, in 1653, he was taken prisoner by a party of French royalists and brought before Cardinal Mazarin, who easily induced him to enter the French service, and he was accordingly made a lieutenant in the regiment of Burgundy. In 1655 he received a commission in the corps of engineers. During that year he directed the sieges of Landrecies, Condé, St. Guislain, and Valenciennes; and in 1657 that of Montmédi, where he was wounded. In 1658 he had the chief direction of the attacks at the sieges of Gravelines, Ypres, and Oudenarde. His fame was now established; and after the peace of the Pyrenees, in 1661, he further distinguished himself by the fortification of Dunkirk, Fort Louis, and Mardyke, which had been ceded to the French.

When the war recommenced in 1667, Vauban had the direction of those sieges which the king conducted in person, and his services gained him preferment, praise, and a pension.

After the peace of Aix-la-Chapelle (1668) he was made governor of Lille, the citadel of which town he had constructed; and besides conducting fresh works at home, he suggested improvements in the fortifications of Turin and other fortresses for the duke of Savoy. In 1672 he accompanied the king in his campaign against the prince of Orange, distinguished himself at Maestricht, where he first introduced the method of approach by parallels, and for a series of important services, terminating with his successful defence of Oudenarde, was made, in 1674, brigadier of the French infantry. During the following year the armies of France were compelled to act on the defensive; but in 1676 he besieged and captured Valenciennes. During this campaign he was appointed maréchal-de-camp, and received a pension, besides a present from the

king of 25,000 crowns. In the following year he was named director-general of fortifications.

The peace of Nimeguen (1678), which relieved him from the duty of taking fortresses from the enemy, enabled him to direct all his energies to the improvement of those which belonged to his country. He rendered the harbour of Dunkirk one of the most important in the north of France, and by erecting new forts and improving those already in existence, gave security to the country on every side.

Hostilities breaking out in 1683, Vauban proceeded in 1684 with the French army into Belgium, where he took Courtray and Luxembourg. The war being suddenly terminated in 1684, he strengthened the fortifications of the latter city, and completed those formidable works, which, by arrangement between the great European powers, were destroyed in 1867. About the same time he executed in part the magnificent aqueduct of Maintenon, by which the waters of the Eure were conveyed to Versailles. When the war again broke out in 1688, Vauban was employed under the dauphin in conducting the sieges of Philipsbourg, Mannheim, and Frankenthal. This year he was made lieutenant-general.

During the year 1690 Vauban was rendered incapable of doing any military duty by a severe illness: he recovered, however, and next year he besieged and captured Mons. In 1692 the siege of Namur was undertaken. It lasted twenty-nine days from the opening of the trenches, during which time five strong sorties were made by the garrison. In 1693 Vauban conducted the siege of Charleroi.

In the following year, the seaports being frequently bombarded by the English fleets, Vauban suggested the formation of magazines and casemates which should be proof against the effects of shells and redhot shot. After the peace of Ryswick he was employed for several years in forming projects for the defence of the country; and in 1698 commenced the important fortress of New Brisach. In 1703 he proceeded to Namur in order to superintend the repairs of the fortifications; when the king elevated him against his will to the dignity of a marshal of France.

In 1706, after the battle of Ramillies, Marshal Vauban was sent to command at Dunkirk, and on the coast of Flanders, where he commenced an intrenched camp, extending from Dunkirk to Bergues, by which the town was secured. This was his last public work. He died March 30, 1707.

During the intervals of his services in the field he employed his leisure in composing his three principal works: these are entitled 'Traité de l'Attaque des Places,' 'Traité des Mines,' and 'Traité de la Défense des Places.' During his life he also found time to write a great number of memoirs on various subjects; and near the end of his days he collected them in twelve folio MS. volumes. His 'Œuvres Militaires' were collected and published in 1796.

VAUCHE'RIA, a genus of plants belonging to the inarticulate *Algæ*, so named from their discoverer, M. Vaucher, a Swiss pastor. The species, nine of which occur in England, are found in pools and ditches and stagnant waters, on damp ground, on the mud of salt-water rivers, and in the sea.

V. dichotoma, large Dichotomous Vaucheria, is one of the most common of the species, growing in spring and summer. *V. clavata*, Clubbed Vaucheria, does not appear to be an inhabitant of Great Britain. It inhabits ditches, and is interesting on account of its power of contraction. By this process its vesicular summits expel the contained sporules, which after their expulsion ascend to the surface of the water.

VAUCLUSE, a department in the south-east of France, formed out of the counties of Avignon and Venaissin, the principality of Orange, the district of Apt, and the valley of the Sault, all formerly belonging to Provence, takes its name from the fountain of Vaucluse, celebrated in the writings of Petrarch. It is bounded N. by the department of Drôme; E. by Basses-Alpes; S. by the Durance, which divides it from Bouches-du-Rhône; and W. by the Rhône, which separates it from Gard and Ardèche. Its greatest length from N.W. to S.E. is 69 miles; its greatest breadth is 38 miles. The area is 1370 square miles, and the population in 1861 was 268,255.

Physical Aspect.—The surface is mountainous, the eastern and southern districts being covered with subalpine ridges, which extend from the departments of Basses-Alpes and Drôme. Mont Ventoux, the highest point, is 6600 feet above the level of the sea. Along the left bank of the Rhône, however, and the right bank of the Durance in its lower course, there is a considerable extent of level country, forming the plain of Orange in the north, that of Avignon in the centre, and Cavaillon in the south. More than one-half of the whole area is arable; about one-fifth is covered with woods; another fifth is under water; and vineyards occupy one-twelfth.

Hydrography.—The department is drained by the RHÔNE, the DURANCE, and their feeders. Among the tributaries of the former are the Lez, the Aigues, and the Sorgues (with its affluents the Nesque, the Auzon, and the Ouvèze). The Calavon and the Lèze are feeders of the Durance. There are a great number of canals for the purpose of irrigating the plains. *The Fountain of Vaucluse* is the source of the Sorgues; it rises amid some most picturesque scenery, in a cavern in the secluded valley of Vaucluse ('vallis clausa') midway between Apt and Avignon. The spring is sufficiently copious to form at once a stream capable of bearing a boat. Not far distant from it is the village of Vaucluse, in which Petrarch lived; and between the two is an old castle where the poet frequently resided.

Climate, Products, and Resources.—The climate of the department is temperate and healthy; the variations of the weather, however, are rapid; tempests are frequent, and the hail is often destructive to vegetation. The soil is generally poor, and does not produce corn enough for the consumption: rye, barley, and wheat are the chief grain crops. Game is very abundant, and wolves, foxes, and wild boars are found. Of domestic animals the sheep are by far the best and most numerous. The ass and the mule are much employed in agricultural labour. Some of the wines have a good reputation, and are extensively exported. A considerable quantity is distilled into brandy. The best wines are those of Côteau-brulé, Châteauneuf-du-Pape, Sorgues, and Beaumes. The soil yields abundance of olives, oranges, almonds, walnuts, pears, peaches, plums, apricots, figs, and melons. Saffron, large quantities of madder, artichokes, anise, coriander, fustic, the yellow grain of Avignon (the produce of a species of buckthorn), and the evergreen oak, are also cultivated. The number of mulberry trees is very great; silkworms are extensively reared, and honey and wax are abundant.

The minerals include iron, coal, lignite, potter's clay, limestone, freestone, and gypsum; but they are of comparatively little importance.

The principal manufactures consist of silk stuffs at

Avignon and Orange; velvet, woollen fabrics, leather, soap, oil, perfumery, confectionery, printing types, glass wares, wax candles, and mineral acids. Silk and madder mills are very numerous. The chief articles of commerce are grain, flour, clover and lucerne seed, madder, silk, wine, brandy, aromatic and medicinal plants, fruits, lavender and other essences, wax, honey, and wool. Railway communication is provided between the principal towns by the line from Lyons to Marseilles.

Divisions, Chief Towns, &c.—The department is divided into four arrondissements, which, with their subdivisions and population, are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1861.
Avignon, . . .	5	20	81,511
Carpentras, . .	5	31	56,661
Apt, ...	5	50	55,720
Orange, . . .	7	48	74,363
Total, . . .	22	149	268,255

The capital of the arrondissement of Avignon, and of the whole department, is AVIGNON. *Bédarrides*, prettily situated on the right bank of the Ouvèze, 7 miles N.E. of that city, has a population of 3003. *Cavaillon*, an ill-built dirty town, on the right bank of the Durance, in a fertile plain, has madder, oil, and silk mills, and 7797 inhabitants. The old fortifications have been demolished; the only building worth mention is the town-hall. The environs are very pretty, and productive in fruits, garden stuff, sumach, saffron, silk, madder, and teazles. *L'Isle*, a town of 6577 inhabitants, situated in an island formed by the Sorgues, 13 miles E. from Avignon, has manufactures of blankets, silken and woollen yarn, coarse cloths, and leather.

In the arrondissement of Carpentras, the chief town, *Carpentras*, is situated in a fertile territory at the foot of Mont Ventoux, on the left bank of the Auzon, 14 miles N.E. of Avignon; and has a civil tribunal, a communal college, and 10,918 inhabitants. It is girt by walls flanked by towers, and pierced with four gate entrances exactly opposite each other; outside of these runs a broad esplanade, planted with trees. The houses are mostly well built, but the streets often narrow and crooked. In the public squares are many fountains, from which an abundant supply of water is obtained. These fountains are fed by an aqueduct (completed in 1734) which crosses the valley of the Auzon by forty-eight arches, and is a massive structure. The other principal buildings are—the cathedral, a Gothic edifice, with a spire of the age of Charlemagne; the gate of Orange, surmounted by a high tower; the Hotel-Dieu, which has a fine façade; the palace of justice or court-house, formerly an episcopal residence, and close by which is a Roman triumphal arch; the hospital, erected in 1751; the theatre, public wash-houses, markets, new prisons, and the public library, containing 25,000 volumes, 2000 MSS., 6000 medals, and various antiquities, nearly all of which were bequeathed to the town, with the building, by Bishop Inguimbert. The inhabitants of Carpentras are employed in distilling brandy, spirits of wine, and various essences, in manufactories of nitric and sulphuric acid, glue, verdigris, and cotton and woollen yarn; or in dye-houses, tanneries, silk or madder mills, the two latter being numerous and extensive. This town is a central depôt for the disposal of the varied products of the south of France, and consequently has a considerable trade in liqueurs, olive oil, fruit, almonds, madder, clover, lucerne seed, saffron, essences of various kinds, honey, wool, wax, and hides, besides the articles manufactured by its own inhabitants. The ancient name of Carpentras was *Carpentoracte*. The Romans embellished it with many edifices, but the successive ravages of the Goths, Vandals, Lombards, and Saracens have left few traces of them. The concordat of 1801 suppressed the bishopric, which had existed since the third century. In 1313 Pope Clement V. fixed his residence here, and made Carpentras the seat of the pontifical see. At his decease the cardinals were so long appointing his successor that the people, exasperated by their endless disputes and consultations, set fire to the college where they had assembled, and the flames spreading, a large portion of the town was consumed. The present walls were built by Pope Innocent VI., fifty years after that event. *Mormoiron*, a market town, 7 miles E. of Carpentras, on the Auzon, has 2511 inhabitants. *Pernes*, 4 miles S. of Carpentras, on the Nesque, an affluent of the Rhone, has a population of 5278, who are chiefly employed in agriculture, but also manufacture some silk, brandy, and wine. *Sault*, higher up the Nesque, has 2674 inhabitants, principally graziers and shepherds.

The arrondissement of Apt is named from *Apt*, an ancient and pretty town, which is situated on the left bank of the Calavon, in a valley surrounded by hills, and covered with vineyards and olive plantations. It is 30 miles E. from Avignon, and has a civil tribunal, a college, and 5785 inhabitants, who manufacture cotton and woollen stuffs, wax candles, confectionery, pottery, brandy, silk twist, and leather. Apt is surrounded by ancient solidly-built walls; the principal streets are wide, clean, adorned with fountains, and lined with pretty good houses. The Gothic church, which is of great antiquity, and built over still more ancient crypts, is the most remarkable building. This church and the ancient cemetery have been classed among the historic monuments of France. Several Roman remains have been found in Apt, which is said to have existed before the Roman conquest; a Roman bridge (Pont Julien) over the Calavon is still perfect. There is a good trade in corn, silks, brandy, wine, black truffles, fruits, honey, and cattle. *Bonnieux*, 6 miles from Apt on the slope of a hill, has 2530 inhabitants. *Cadenet*, 12 miles S. from Apt, on the right bank of the Durance, in a fertile country, abounding with Roman remains, has a remarkable ancient church, and 2737 inhabitants. *Pertuis*, an ancient town, 18 miles S. by E. from Apt, situated near the entrance of the Lèze into the Durance, has brandy distilleries and a population of 4859.

In the arrondissement of Orange the chief town is ORANGE. *Bollène*, 22 miles N. of Avignon, on the Lez, a feeder of the Rhône, stands in a fertile country, and has a population of 5000. *Malaucène*, a busy little town of 3029 inhabitants, whose chief employment is silk spinning, is prettily situated in a valley surrounded by picturesque mountains, 16 miles E. from Orange. *Vaison*, said to occupy the site of Vasio, a town of the Vocontii, and built on a steep rock above the Ouvèze, 15 miles N.E. of Orange, has 3404 inhabitants. *Valréas*, 19 miles N.E. from Orange, stands at the foot of the Dauphiny mountains, and has dye-houses, tanyards, and a population of 4901.

The department forms the see of the archbishop of Avignon; it is included in the jurisdiction of the Imperial Court of Nimes, and Academy of Aix; and is in the ninth Military Division, of which Marseilles is

head-quarters. It returns two deputies to the Corps Legislatif. (*Dictionnaire de la France; Annuaire pour l'An* 1868.)

VAUD, the most westerly canton of Switzerland, is bounded N. by Neufchatel; E. by Freyburg, Bern, and Valais; S. by the Lake of Geneva; and W. by France. The area is 1200 square miles, and the population 213,157, nearly all Protestants. The central part of the canton is traversed from E. to W. by a succession of heights and a table-land known by the name of Jorat, which connects the Jura with the Alps, and divides the waters that flow northwards into the lake of Neufchatel and the Aar, from those which run southwards into the Lake of Geneva and the Rhône. There are numerous valleys, and the climate varies much in different localities, but is on the whole both temperate and salubrious. The warmest and best-sheltered districts are on the east shores of the Lake of Geneva. There the vine is planted in terraces on the slopes of the hills, and its cultivation forms an important branch of rural industry. These vineyards are some of the best in Switzerland, and produce excellent white wines. The canton is essentially agricultural: the highlands of the Jura and those of the Alps on the east, towards the borders of Bern, feed considerable herds of cattle. Horned cattle, sheep, goats, horses, and pigs are numerous. Corn is not produced in sufficient quantity for the consumption of the population. Fruit trees are abundant, and the forests cover large tracts. The principal trees are ash, elm, alder, and pines (on the mountains): the oak is seldom seen. Large quantities of walnuts, chestnuts, filberts, &c., are grown. The minerals include salt from the springs of Bex (which are almost the only ones of the kind in Switzerland), marble, coal, sulphur, iron, and a few other metals; but mining operations are only carried on to a limited extent, and the quantity produced is very small. The manufactures are unimportant, being merely for the supply of the native population; but there is an active transit trade with France and Germany. The canton is traversed by railways, which connect it with several other parts of Switzerland, and also with France. The inhabitants are industrious and well educated, supplying a large proportion of those Swiss teachers of languages and governesses who are found in almost every European country.

The constitution was formerly much more aristocratic than in most of the other Swiss cantons; but it is now a pure democracy—every citizen of twenty-three years of age, and with a good character, having a vote in the election of the general council, which meets twice a year for about a month. Vaud forms a part of what is known as French Switzerland. The common people speak a dialect of the old Romance language; but the higher classes talk French. The canton holds the nineteenth place in the Swiss Confederation.

The principal towns of the canton are—LAUSANNE. *Vevay*, which is beautifully situated 12 miles E. of Lausanne, on the north shore of the Lake of Geneva, and has about 6000 inhabitants, who manufacture leather, woollens, and jewellery; and carry on a considerable trade in wine. It is regularly built in the form of a triangle; has spacious streets, and a large market-place lined on three sides by handsome buildings, and on the fourth planted so as to form a fine promenade. There are also two churches, a college, public library, corn magazine (with eighteen marble pillars), town-house, hospital, &c. The church of St. Martin, which is surrounded by trees, stands on a lofty height, and contains the tombs of Ludlow and Broughton, two of the regicides of Charles I., both of whom died here in exile. Vevay is 1229 feet above the sea; and its mean annual temperature is 49°, in summer 67°, and in winter 34·9 Fahr. The beauty of the town and neighbourhood attracts many foreign residents. *Yverdun*, on the Lake of Neufchatel, 18 miles N. of Lausanne, has 4000 inhabitants, and an old castle, in which Pestalozzi established his celebrated educational institute in 1805. *Avenches*, a little village with 1756 inhabitants, 1½ mile S. of Lake Morat, stands on the site of the ancient *Aventicum*, which was the capital of the Helvetii, and afterwards a Roman colony. It was destroyed by the Huns in 447; but several inscriptions and splendid ruins still remain to attest its former splendour. *Moudon*, *Morges*, *Myon*, and *Payerne* are all small and unimportant towns of less than 4000 inhabitants.

VAUDOIS ('Waldenses,' or 'Valdenses;' in Latin 'Vallesi;' 'Valdési' in Italian; 'Vaudés' in their own dialect), a remarkable people, who form a communion separate from the Church of Rome, and who live in three high valleys of Piedmont, on the eastern or Italian side of the Cottian Alps, between Mount Viso and the Col de Sestrieres. The valleys are—1, that of Lucerna, through which flows the Pelice, an alpine torrent which falls into the river Clusone; 2, the valley of Perosa, through which passes the Clusone, which rises in the Col de Sestrieres, flows S.E. by Fenestrelle, Perosa, and near Pinerolo, and, after receiving the Pelice, joins the Po a few miles farther down; 3, the valley of San Martino, which branches out of that of the Clusone, along the course of a torrent called Germanasca. Of these three valleys, the southernmost, that of Lucerna, is tolerably productive: gardens and vineyards, orchards, cornfields, and pastures, are seen in pleasant succession; but the other two are little favoured by nature. The inhabitants grow some corn and maize; they have also sheep, goats, and cattle, but not many horses. Silkworms are reared in some places, and silk is made. The farmers are mostly métayers; that is to say, they pay to the landowner half the produce of the ground, either in kind or money. Most of the peasantry have with their cottages a few roods of land of their own; some are possessed of a few acres. The three valleys together comprise an area of about 22 miles in length from N. to S., and 18 miles in width from E. to W., confined between the right bank of the Clusone and the left bank of the Pelice. The population amounts to about 20,000 individuals. The Vaudois are distributed in thirteen parishes, each having its pastor. The principal villages are—La Torre, in the valley of the Pelice, or Lucerna, with about 2000 inhabitants; San Giovanni, Angrogna, Bobbio, and Villaro, in the same valley; Pomaretto, in the valley of the Clusone; San Martino, Villasecca, and Perera, in the valley of the Germanasca. In every parish there is a church and a school. The origin of the name Valdenses, or Valdési, is supposed by some to be derived from the word *vallis*, and to mean 'inhabitants of the valleys;' but by others is traced to Peter Waldo, or Valdo, of Lyons, a merchant, who was a religious reformer, and being condemned by the archbishop of that city in 1172, was obliged to leave his own country. The Albigenses, properly so called, were quite distinct from the Vaudois. [ALBIGENSES.]

This little community is remarkable for having kept itself from time immemorial separate from the Church of Rome, in ages when it was the only existing church in the West, and for being the only Italian church which continues to this day divided from the Papacy.

The Valdenses have always rejected any distinctive

sectarian appellation, and have boasted of adhering from age to age to the primitive faith. In 1230 Reinerus, a Dominican friar, in a treatise against heretics, 'Opusculum de Hæreticis,' says of the Valdenses that 'they reject whatsoever is taught, if it is not demonstrable by a text in the New Testament.' And then he goes on enumerating many places where the heretics have churches and schools: all which shows that dissent was very widely spread in north Italy and the south of France in the thirteenth century, and it corroborates the traditions of the Valdenses, that their doctrines spread at one time over many districts on both sides of the Alps.

The persecutions which they have sustained from the Roman Catholic Church, and from potentates who were under the influence of that church, fill up a large portion of their history. Botta, a Piedmontese and a Roman Catholic, but a temperate and discriminating writer, has given a full and faithful account of those sufferings, and done justice to their constancy.

When Bonaparte annexed Piedmont to France he placed the Vaudois on a footing of equality with their Roman Catholic countrymen, and assigned funds for the support of their clergy. At the restoration in 1814 the Vaudois were remitted under their former disabilities, and those who had purchased land beyond the limits of their valleys were obliged to sell it to Roman Catholics; and it was not until the accession of Victor Emmanuel as king of Italy that they were placed on the same footing as their Roman Catholic fellow-subjects.

VAUQUELINITE, a mineral which occurs in spotted black crystals, and so called in honour of M. Vauquelin, the eminent French chemist; specific gravity, 5·8; hardness = 2·5 to 3·0. Its component parts are oxide of lead, 61·2; chromic acid, 27·9; oxide of copper, 10·9.

VAUXHALL, a thickly populated district of London, on the south bank of the Thames, between Battersea and Lambeth, containing the goods terminus of the London and South-Western Railway, and several important manufactories. An iron bridge, built in 1811–16, connects it with the opposite suburb of Pimlico. Vauxhall Gardens, once a fashionable place of resort, have ceased to exist for some years, and their site is now occupied by some well-built houses. They appear to have been opened in May, 1660, and during the reigns of Charles II., William III., Anne, and the Georges, enjoyed a high degree of popularity. The principal amusements were tight-rope dancing, concerts, ballets, vaudevilles, and fireworks; and vivid pictures of the scenes enacted in these gardens, scenes often brilliant, always gay, but too frequently licentious, are painted by our satirists and dramatists. They have also been sketched by Thackeray in his 'Vanity Fair.' Vaux Hall is a corruption of Fulke's Hall, and was anciently the manor and residence of Fulke de Breanté, a trusted counsellor of King John. It was here that Lady Isabella de Fortibus, heiress of William de Vernon, sold her rights and privileges as Lady of the Isle of Wight to Edward III.

VECELLIO. [TITIAN.]

VEDA (from the Sanscrit root *vid*, 'to know') means the sum of all knowledge; or, according to another etymology, the knowledge which contains the evidence of its truth within itself—that is, revelation. But this term, although in some instances it combines the whole learning (the eighteen vidyâs or sciences) of the Hindus, is specially applied to the four principal books of their sacred writings—the Rig, Yajur, Sâma, and Atharva. The Rigveda (from the radical *rich*, 'to laud') is intended to be read on occasions when encomiastic prayers and hymns to the elemental deities are prescribed by the law; the Yajur (from *yaj*, 'to sacrifice') relates chiefly to oblations and sacrifices, and contains prayers adapted for certain rites to be performed at the full and change of the moon, and hymns and directions regarding oblations to the manes; the Sâmaveda contains songs of lyrical character to be recited with melody; and the Atharvatveda, which is considered to be of later date, and is seldom included in the term 'the Vedas,' consists of various hymns and incantations, the greater part of which are intended for the destruction of enemies. To these books the Hindus attach the greatest sanctity. They state that Brahmâ himself made them proceed from his mouth, or that he milked them out from fire, from air, and from the sun ('Manu,' i. 23), for the due performance of the universal sacrifice. According to this tradition they were coeval with creation, which had itself taken place according to the laws of a pre-existing veda. They were, however, scattered; some legends state that they were lost; and it was not till after many years that a Rîshi, or 'sage,' arranged them and gave them the form in which they now are. This arrangement procured to the editor the name of Vyâsa, 'the arranger.' He is said to have lived about 5000 years ago; hence his surname of Dwâparâyana, that is, he who belongs to the second age, or yuga, of the world. When he had distributed the fragments of the vedas into four parts, he taught them severally to four different pupils. In the course of time the pupils of these four altered some things in the arrangement of the several vedas, and thereby they became founders of different schools, which are termed S'âkhâs, and are very numerous. But the difference between these various schools of the veda chiefly rests upon a mere transposition of the various hymns which constitute their Sanhitâs, or collection of sacred songs, and has consequently no influence on the doctrine which they contain.

Each of these four vedas is divided into two parts, the Sanhitâ, and the Brâhmana, the latter of which is a collection of precepts and maxims (Colebrooke, i. 12, note), or, according to Jones' translation of 'Manu,' iv. 100, of chapters on the attributes of God. Under the head of the Brâhmana of a veda the Hindus comprehend also the various Upanishads which belong to it: these are more of a dogmatic character, and exhibit in a more comprehensive form the doctrines which are obscurely expressed in the fragments, which, in fact, are all that can be truly said to form an original veda. The four Upavedas or subvedas, and the six Vedangas or supplementary parts of the vedas, with the Upangas, or subordinate parts, constitute in great measure that kind of literature which enables one better to understand the tenor of the sacred Trayî (the name under which the three vedas are collectively understood, meaning Triad). The age of the vedas has been the subject of conflicting opinion. The date now generally assigned to them is the tenth and eleventh century before the Christian era.

Their fundamental doctrine seems to be this:—The various elements which constitute this universe are only the various parts of the universal and primeval soul, the objective That, which by the very dismemberment of itself, had lost its subjectivity. Throughout the vedas there runs a strong vein of belief in the fall of man, who, though he had received his own existence through the self-immolation of the Creator, and was originally part of him, had lost his primeval purity, to recover which sacrifices of various kinds were ordained in imitation of the great, original, and universal sacrifice.

The Vedic monotheism, which one would be sometimes inclined to doubt from the numerous Devatâs or elemental deities who are invoked in the Mantras, will appear plainly enough if the reader has the patience to read the following passage: 'The deities are only three; whose places are the earth, the intermediate region, and heaven: (namely) fire, air, and the sun. They are pronounced to be (the deities) of the mysterious names (Bhur, Bhuvar, and Swar), called the Vyâhritis (see 'Manu,' ii. v. 76) severally, and Prajâpati ('the lord of creatures') is (the deity) of them collectively. The syllable Om means every deity; it belongs to him (Parameshṭ'i) who dwells in the supreme abode, &c. Other deities belonging to those several regions are portions of the (three) gods; for they are variously named and described on account of their different operations; but (in fact) there is only one deity, the great soul (Mahânâtma).' Numerous passages of the same kind occur in almost every page of the Vedic literature, by which we mean the Upavedas. (Professor Max Müller's *History of Sanskrit Literature.*)

VEDETTE, or VIDETTE, a dragoon or horseman stationed on the outpost of an army to watch an enemy and give notice of danger.

VEDRO, the principal Russian measure for liquids, which has been definitively determined at 750 cubical inches for its contents, or 2·7051 imperial gallons.

VEERDT, or WEERDT. [Limburg.]

VEERING, or WEARING (from the French, *virer*), is that movement of a ship in which, supposing her to have been previously sailing with the wind on either bow, she is brought, by her head being turned to leeward, into such a position that the wind is on the other bow, and the direction of her course is changed.

When a ship has not sufficient velocity to allow of being *put about* by tacking, and it becomes necessary to change her course by veering, the evolution is thus effected:—As soon as, in drifting to leeward, she begins to fall off, or to turn her head from the wind, the helm is placed hard a-weather, and the after-sails are hauled up so that the wind may act upon the others only, and that the ship may be brought before the wind: the helm is then placed exactly fore and aft, and the velocity of rotation continuing, the ship's head begins to turn towards the wind, which will then be on the opposite bow. The helm being now turned to leeward, the mizen-sail hauled out and its stay-sails set, the ship comes rapidly into the required position. The disadvantage of veering is that, during the evolution, the vessel is sometimes carried far to leeward, and the loss of space can only be diminished by executing the movement with as much rapidity as possible.

Box-hauling is an evolution similar to that of veering, and is put in practice when a rock or some other danger is suddenly seen a-head.

VEGA CARPIO, LOPE FELIX DE, was born at Madrid, November 25, 1562. The son of a poet, he himself manifested extraordinary poetic facility at a very early age. He had written several poems and four dramas before he was thirteen years old. Soon afterwards he ran away from school in order to 'see the world;' but was overtaken at a short distance from Madrid, and consigned to his friends. Upon his return to Madrid, young Lope, by means of several pastorals, and a comedy in three acts, called 'La Pastoral de Jacinto,' ingratiated himself with the bishop of Avila, through whose liberality he was enabled to enter the University of Alcalà, where he remained four years. He next became attached to the duke of Alva, at whose request he wrote his 'Arcadia;' which, written perhaps as early as 1580, was not publis 1598. He had previously married a lady of ran Isabel de Urbino. He continued to cultivate with increased enthusiasm, until, having wou gentleman of rank in a duel, he fled to Valenc it was some years before he ventured to return family. Soon after this his wife, to whom tenderly attached, died; and to escape from recollections Lope became a soldier, and joined t vincible Armada.' During this unfortunate voy composed his 'Hermosura de Angelica.' He now the career of arms, and entered the service, first, marquis of Malpica, and afterwards of the co Lemos, with whom he remained until his second mar to Doña Juana de Guardia, a lady of Madrid. eight years after this event, in 1598, on the occas the canonization of St. Isidorus, Lope entered th with the best poets of the day, and surpassed the in the number and merit of his performances.

This was perhaps the most fortunate period o life. He had, by his own statement, already writt less than 900 dramas for the stage, besides t volumes of other poetry; he wrote so much, had so many presents conferred upon him, that he enabled to live in affluence. But his spirit seem have sunk under the loss of his second wife and a whom he dearly loved, and he resolved to soothe i the exercise of devotion. Accordingly he becam priest, and in 1609 a sort of honorary member of brotherhood of St. Francis. Meanwhile he sel passed a year without giving some poem to the pre and scarcely a month, or even a week, without prod ing some play upon the stage. In a very short span time 'Los Triumphos de la Fé,' 'Las Fortunas Diana,' three novels in prose, 'Circe,' an heroic poe and 'Philomena,' were the fruit of his prolific pen.

His 'Soliloquies of God,' though printed under feigned name, secured him as many admirers as h former productions. His 'Corona Tragica' he ded cated to Pope Urban VIII., who conferred on him t degree of doctor of theology. He was at that time r garded with unbounded admiration both at home a abroad. He continued to publish plays and poems t the year of his death, when his health began to decli and he expired August 26, 1635.

In addition to the works mentioned above he wr several epic poems, as 'La Jerusalem Conquistad 'La Circe;' 'La Dragontea' (on the death of Sir Fran Drake); 'La Andromeda;' numerous pastorals; 'L Pastores de Belen;' 'La Dorothea,' &c., &c.; a bu lesque poem, entitled 'La Gatomachia;' several epistl and other short poems, which were collected and prin at Madrid, 1776–79, 21 vols. 4to.

Lord Holland has given, after Huerta, a list of all t dramas attributed to Lope de Vega which exist in pri There are 496 plays, and twenty-one 'Autos Sac mentales,' in all 518, to which number may be add many which have been lost, and many more wh though acted on the stage, were never printed, beca those which are preserved in manuscript. It h been stated that no less than 1800 of his plays w acted on the stage. There is an edition, consisting twenty-five volumes in 4to, published in parts betw 1609 and 1647, at Madrid, and other places in Spa which is of excessive rarity.

VEGETABLE BUTTERS. [Butters, Vege table.]

VEGETABLE CHEMISTRY is that branch

organic chemistry which treats of plants and of the products of their chemical actions upon matter in its various forms. It thus embraces both *organized bodies*, such as cellulose, ligneous tissue, &c., and *organic compounds*, such as sugar, starch, vinegar, &c. When applied in the service of agriculture, it treats of the ingredients of plants and of the ways in which these can be furnished to the soil by means of manures. In its application to organized bodies the analytic method can only be employed, because such bodies cannot be synthetically prepared. The wood of the tree, the leaves of the plant, the corolla of flowers, &c., result from the action of living bodies on inorganic substances. 'Living bodies have the power of assimilating fresh particles, and of arranging them in the special form which characterizes the class to which the individual organism belongs.' The nature of this assimilative force, and of the link between it and inorganic matter, lies beyond the scope of the chemist. Not so, however, its relations to the soil on the one hand, and the atmosphere on the other. These he has determined, and in doing so he has made known and explained a series of most important and deeply interesting interactions between the plant, the soil, and the atmosphere, of great value, whether regarded from the sanitary or the industrial point of view. As regards organic products, the applications of vegetable chemistry are daily increasing. Plants are now utilized which a few years ago were wholly useless. While the elements which are the chief constituents of plants are not more than three or four in number, yet the differences of chemical arrangement in which they occur give rise to an infinite number of bodies, some of which constitute the chief food of men; and others, having the self-same elements in different combinations, are deadly poisons. These remarks might be very fully illustrated; but it would be beyond the scope of this notice to do more than define the limits of this branch of chemical science. The student will find in the works of Mulder and Liebig full information regarding the different groups of vegetable products, and the methods by which they are separated from the plants in which they occur.

VEGETABLE EARTH, in Horticulture, the soil which is usually called Mould; in Agriculture, the surface soil of hollows which contain alluvial soil, a black vegetable matter, beneath.

VEGETABLE IVORY, the *Taqua* nut, the fruit of a species of Palm, the *Phytelephas Macrocarpa*, a native of South America. When the seeds are young, they contain a clear tasteless liquor regarded as a refreshing drink by the natives. As they become ripe the liquor hardens into a compact substance, which takes a high polish, and is named Vegetable Ivory. It is much used in the manufacture of small ornaments, toys, and similar articles.

VEGETABLE MARROW is the fruit of a species of gourd, *Cucurbita ovifera*, a native of Persia. It is used for culinary purposes, and so named from the peculiar tenderness and softness of its flesh substance. It is easily cultivated in any garden.

VEGETABLE MORPHOLOGY, or METAMORPHOSIS, is that department of science which contemplates the laws regulating the forms of plants and of their particular parts. In the earlier period of the history of botany, plants were studied as individuals, or groups of individuals, without any reference to the general laws which governed either their external or their internal forms, or those which influenced the production of various forms in the same individual at different periods of its existence, or of the same species under varying circumstances.

Linnæus, although he never made any practical application of his idea, seems to have been the first to have suspected that the varied forms of the flowering organs, and even other appendages of the axis of the plant, were modifications of the leaf. In his 'Philosophia Botanica' occurs the following remarkable passage:—'The origin of the flowers and the leaves is the same; the origin of the buds and the leaves is the same: the bud consists of the rudiments of the leaves; the flower comes from the rudiments of the leaves united.' Although the doctrine of morphology, to a limited extent, was thus aphoristically proclaimed by the great Swede, and many facts pointed out by him to prove its truth, yet little or no notice was taken of this department of science by his followers. The next person who drew attention to this subject, and apparently quite independent of Linnæus, was not a botanist, but a poet. Goethe frequently occupied himself with natural history studies; and in one of his letters, dated 1786, mentions that he believed he had discovered 'the whole secret of the generation and organization of plants, and that it is the simplest thing that can be imagined.' It was some years after that he first published his poem on the metamorphoses of plants, in which he distinctly states the great law of morphology, that every part of the plant is but the repetition of a primitive type. This was followed by a paper on the subject, in which he clearly points out the importance of this idea of the unfolding of a primitive type. At the time these papers were published they were regarded as the fancies of a poet rather than the sober realities of science. In Great Britain they found but little favour, but were quietly studied by Robert Brown, who by a series of accurate observations demonstrated the practical value of the morphological idea in the arrangement of the various families of plants. Goethe's simple but grand idea was also adopted by De Candolle, in his doctrine of a primitive type among plants, from which all departed by the decrease, increase, and adhesion of their organs.

Morphology may be divided into two great divisions:—First, that which treats of the forms of plants and their organs in general, and which is only concerned with a few of those general forms which are found common to all plants; and secondly, that which treats of the forms of particular groups of plants and of individual organs. This latter department is by far the most extensive, and is that which contributes so greatly to the just apprehension of the relations which exist between the various groups of plants and their organs. It may be divided into two parts, one of which regards the external form of the plant, as resulting from the combination of the various tissues into organs; the other treats of the internal form which the various tissues of the plant assume.

There are certain general principles in morphology which have been everywhere assumed in describing the organs of plants, such as that every plant has an ascending and descending axis; the former called the stem, and the latter the root. These may be traced downwards or upwards through the various series of plants; downwards till we arrive at a point where the cells exhibit no tendency to either an ascending or descending growth, as in the cells of Protococcus; or upwards till the increasing development of the stem exists in the most complicated variety of forms. It is in the latter or higher groups of plants that the laws of morphology have been studied with greatest attention,

and have led to the belief that its only application existed in the series of changes which the leaf of the higher plants undergoes in its conversion into the parts of the flower and the fruit. It is from this department of botany that the most convincing illustrations of the truth of the laws of morphology may be drawn, and it is here that the most obvious practical applications of them may be made; but form does not more distinguish the higher than the lower plants, and in many of the phenomena of the latter, morphological laws as general may be applied as to the highest plants.

The leaf, however, affords the best illustration of the nature of morphological laws. This organ may be regarded as a theoretical point of departure for all other organs which are found upon the stem. The word theoretical is used here to prevent the supposition ordinarily entertained, that organs which are said to be metamorphosed have ever really been leaves at all. The leaf is only the theoretical type on which the other organs are formed, and from which they are supposed to have departed. In support of this theory we have the fact, that all the organs of the axis may be traced by insensible gradation either to or from the leaf. Thus the bract is often undistinguishable from the leaf, the sepal from the bract, the petals from the sepals, the stamens from the petals, the carpels from leaves, and the ovules from leaf-buds. This is the series of gradations which prove the positions of morphology. When these gradations take place, as they mostly do in nature from the leaf to the internal organs of the flower, it is called an ascending metamorphosis; when it takes place from the central organs of the flower to the leaf, it is called a descending metamorphosis. This latter phenomenon is frequently observed in cultivated plants, and such changes are called monsters. Most of the double flowers of our gardens are the result of a descending metamorphosis, in which petals are developed instead of stamens. As an instance of organs which have not assumed the development of leaves, but which yet are formed on the same type and obey the same laws, we may name the stipules and scales of leaf-buds.

The result of these facts is that we may regard the flower as a collection of leaves arranged in whorls, and in fact a branch with a short axis. This idea explains at once those apparently anomalous occurrences where branches grow out of the fruit of the pear or the apple. The apple does but represent the growing point of a branch, which, if the circumstances no longer exist which produced the peculiar leaves from which it is formed, will take the ordinary growth of a branch. The admission of these principles has led to the expression of certain laws which regulate the growth of the flowers and fruits of plants, and which, being applied to their peculiarities, are the best means of securing a natural classification. These laws are:—1. That each series of floral envelopes must normally alternate with that which preceded it. 2. That the number of parts in every series must be equal to or a multiple of the number of parts in the first or outer series. The actual departures from this theoretical structure are numerous, but they may be reduced to the simple conditions of the increase, decrease, or adhesion of the various organs, which also obey definite laws.

VEGETABLE PHYSIOLOGY. [PHYSIOLOGY.]

VEGETABLE WAX. Various plants yield a substance like wax, which is obtained like the vegetable butter, by bruising and boiling them in water, when the wax melting floats to the surface and there concretes on cooling. Of these the most remarkable instance is the *Ceroxylon andicola*, the Wax Palm, Palma de Cera of the American Spaniards. Myrica Gale, Candleberry Myrtle, or Sweet Gale, a native of this country, yields a substance resembling bees' wax when its catkins or cones are boiled in water: so *M. cerifera*, a native of North America, affords a similar substance when its berries are thus boiled: candles are made of it also, whence the plant is commonly called Tallow-shrub or Candleberry-tree. *M. quercifolia*, a native of the Cape of Good Hope, is another species which supplies a vegetable wax. It grows along the coast, on dry sandy plains exposed to the sea-air, where hardly any other plants will vegetate. The wax invests the berries in the form of a rough crust, which is separated by means of boiling water. It is of a greenish colour, but may be bleached. When made into candles it gives a very fine light. A vegetable wax is also obtained in China from *Ligustrum lucidum*, which is frequently mentioned as the Wax-tree in Dr. Abel's travels. The imports of vegetable wax into the United Kingdom in 1866 amounted to 4796 cwts., value 26,151*l.*, principally from Japan, China, and Singapore. In the same year 2864 cwts., value 15,621*l.*, were exported. [CEROXYLON ANDICOLA; PALMS.]

VEGETABLES. VEGETABLE KINGDOM. Although the more common objects in nature are easily referred to the respective kingdoms to which they belong, as a block of granite to the mineral, an oak to the vegetable, and a man to the animal kingdom; yet each of these has referred to it objects whose characters are doubtful. It is on this account that naturalists have sought for such a definition as would enable them at once to refer to one or the other division the various objects in nature. With this view Linnæus laid down the following axiom:—'Mineralia crescunt; vegetabilia crescunt et vivunt; animalia crescunt, vivunt, et sentiunt.' But this will not assist the naturalist much. The mineral kingdom is perhaps not often confounded with the other two, although its distinction could not always depend on the definition of Linnæus. The distinction given between the animal and vegetable kingdoms is the possession of sensation by the former. But how is sensation to be determined? If by motion from external stimuli, then ought the sensitive-plant and Dionæa to be called animals, and sponges and jelly-fishes plants; if, on the other hand, the possession of a nervous system is to determine the point, then, as we have failed to demonstrate this in the sponges and polyps, they must still be called plants. Cuvier defined an animal by its possession of a stomach; but this fails of being a distinctive mark in many of the lower classes of what are generally admitted as animals; and the Aristotelian indication, the possession of a mouth, cannot be always applied. There is, in fact, still a great difficulty in determining the limits of the vegetable and animal kingdoms; and botanists and zoologists are constantly putting in their claims for the right of exclusive study of certain beings which exist at the point where the two kingdoms meet. That there is such a point may be easily made apparent by tracing the groups of plants from the exogens through the endogens down to the lower forms of fungi and algæ, and animals from the Mammalia, through birds, reptiles, fishes, molluscs, and polyps, down to the infusoria and sponges.

The following is the definition of a plant by an eminent botanist, and it is, perhaps, as good as can be given in the present state of our knowledge:—'A plant is a living body deprived of sensation or power of mor-

ing from place to place, and fed by means of external roots.'

The vegetable kingdom performs important offices in the economy of creation. It stands between the mineral and animal kingdoms, disposing and arranging the elements of the first, in order to fit them for the purposes of the last. Each of the three kingdoms of nature is composed of matter as its basis; but the animal directly appropriates no portion of the elements of the inorganic world to its uses, but derives them all from the vegetable. The researches of modern chemists, more especially those of Mulder and Liebig, show that the proximate principles of animal bodies are identical with those of vegetables, and that consequently, as these principles do not exist in the inorganic kingdom, they must have been formed in plants. Thus we must regard the vegetable kingdom as one vast chemical laboratory, in which the food of animals is being prepared. Without vegetables animals would perish, and although some animals live on the flesh of others, yet that flesh is always originally derived from the vegetable kingdom. The proximate principles of plants are not numerous, and are composed of hydrogen, oxygen, nitrogen, and carbon; those containing nitrogen are directly appropriated by animals to the formation of their tissues, whilst those containing no nitrogen are either consumed in generating animal heat, or deposited in the form of fat. When animal bodies cease to exist, their tissues become resolved into their primitive elements, a process which is constantly going on in animal bodies during life. These elements, in the state of various compounds, are carried off into the atmosphere, when gaseous; or assist in forming the soil on the surface of the earth, when solid. The principal compounds which are thus generated are carbonic acid and ammonia; and if accumulation of these gases took place to any extent in the atmosphere, the consequences would be a cessation of vitality in both the animal and vegetable kingdoms; but here again plants perform an important office, for these very compounds, combined with water, are the principal sources of the elements which plants elaborate into so many secretions necessary to the existence of animals.

VEGETARIAN. One who abstains from animal food, and lives exclusively on vegetables, eggs, milk, &c.

VEGETATION, the collective phenomena presented by plants in their distribution over the surface of the earth. It is not till within a comparatively recent period that any attempt has been made to ascertain in what manner the varied forms of plants are distributed over the surface of the earth, or what causes determine the existence of one plant in a particular locality or country, to the exclusion of others. The labours of Humboldt, Von Martius, and Schouw, have done much towards elucidating the former point, and the progress of vegetable anatomy and physiology is constantly revealing the causes of the latter circumstance. It has indeed been known for a long period that the ordinary productions of one country were not to be obtained from another, and that the vegetation of cold and hot countries differed; but this knowledge, up to the time of Linnæus, was of the most general and unsatisfactory character.

The great agents which seem to determine the distribution of plants on the earth are Light, Heat, Water, Soil, and Atmosphere; those external conditions, in fact, which most influence their vital functions. Their general influence has been examined by De Candolle, who comes to the following conclusions:—

1. The natural situation of each plant at a determined elevation above the level of the sea is so much greater in proportion as the country is nearer the equator, and less in more temperate regions.

2. In temperate climates, as France, for instance, those plants which are but little affected by temperature, and which grow in all its latitudes, are also found at all those elevations where the earth is not covered with perpetual snows.

3. Of plants which, according to their nature, avoid either too high or too low a degree of temperature, yet grow at different latitudes, we may observe, that it is at heights where the effect of elevation may compensate that of latitude: thus the native plants of the northern plains will be seen to grow upon the mountains of the south.

4. Plants which are cultivated upon a large scale are guided by laws which entirely correspond with the preceding: those which are cultivated in various latitudes will grow indifferently at various heights; those which are only found at certain latitudes will extend no farther than to proportional elevations.

5. The elevation above the level of the sea, when we compare the temperature of the seasons, establishes effects very analogous to those which result from the distance from the equator; so that there is the more analogy between the results on vegetation in the two cases. In proportion as we rise in a direct line, it follows, from the lessened density of the air, that the intensity of the solar light continues to increase: this effect is represented in the line of distances from the equator, because the perpetuity of light during the continuance of vegetation is so much the greater in proportion as the latitude is higher.

6. In proportion to the greater height upon the mountains, so will the hygrometer be seen to indicate a less degree of humidity: the same general effects take place as we recede from the equator to the poles.

VEINS. [Circulation of the Blood; Heart.]

VEINS, DISEASES OF. Of these the most frequent is that in which they become what is called Varicose, that is, dilated and unnaturally tortuous, a disease which occurs especially in the subcutaneous veins of the lower extremity. It is the result of the coats of the veins losing their elasticity, and thereby their power of resisting the pressure of the column of blood above them. The loss of elasticity is commonly due to disease of their coats, and is frequently accompanied by an increase in their thickness, and by destruction or impairment of their valves.

For this varicose state of the large veins numerous remedies have been proposed; but the best are only palliative.

That which is particularly termed a *Varix* is either a mass of dilated and tortuous veins, or a single saccular and circumscribed dilatation of a vein analogous to the circumscribed aneurism of an artery. This circumscribed dilatation is a very rare disease, but in its consequences does not differ from ordinary dilatation. An aneurismal varix is produced when, a communication being made, either by a wound or by ulceration, between an artery and a vein, the latter is dilated by the force of the arterial blood into a circumscribed sac.

The most serious disease to which the veins are subject is acute inflammation, or Phlebitis. It sometimes occurs after the slight wound made in ordinary bleeding; it is more common after operations upon varicose veins; and yet more frequently occurs after amputations of the limbs. Slight cases of phlebitis not unfrequently come on, as if spontaneously, or after

exposure to cold, in varicose veins. The more severe phlebitis is a most dangerous disease. Lymph is effused into the cavity of the vein, and into the tissue of its walls, rendering them thick and hard; the vein and the tissues immediately around it become exquisitely tender, and the parts whose blood should be returned through the diseased vein are usually œdematous. In a further stage pus is effused into the cavity of the vein, and, mixing with the blood, it may pass into the general current of the circulation, though more commonly the vein is obliterated above the chiefly inflamed part by lymph deposited on its walls, and thus the passage of pus into the circulation is prevented. With the local inflammation of phlebitis a state of low typhoid fever, with muttering delirium and great exhaustion, is usually combined; and under these the patient dies.

One of the most fatal forms of phlebitis is that which affects the veins of the uterus and the neighbouring parts after labour, and which chiefly constitutes one of the diseases included under the name of Puerperal Fever. *Phlegmasia dolens*, or *Phlegmasia alba*, is due to phlebitis of a less severe kind affecting the iliac or femoral vein, or both, and many others adjacent to them. By obliterating the venous trunks, and preventing the circulation through them, the disease gives rise to the firm œdema, accompanied by the tightness and glossy paleness of the skin of the leg and thigh which peculiarly indicates it.

VELARIUM. The great awning which, by means of tackle, was hoisted over the Roman theatre or amphitheatre, to protect the spectators from the rain or sun's rays.

VELAY, LE, a subdivision of Languedoc, in France, is now comprised in the department of Haute-Loire. Le-Puy was its chief town.

VELA'ZQUEZ, DIE'GO RODRIGUEZ DE SILVA Y, the greatest of Spanish portrait painters, was born at Seville, June 6, 1599. Having manifested, while yet a child, a decided bias for drawing, he was placed under Francisco Herrera el Viejo. Driven by ill usage from this studio, he entered that of Francisco Pacheco, who was the very opposite of Herrera in all respects. The mediocrity of this master happily had no influence upon Velazquez. After five years' of purely nominal instruction, he married Juana, Pacheco's daughter; and, thrown on his own resources, the young artist turned to Nature for his guide, and he followed her faithfully to the end. His pictures of this period are very scarce. The Adoration of the Shepherds, now in the Louvre, is the earliest of his undoubted productions, but it is nothing more than a copy from Spagnoletto.

In the spring of 1622 Velazquez visited Madrid, where he painted the portrait of the poet Gongora. He then returned to Seville, but was recalled to the capital the next year by Olivarez, the prime minister, and having painted his portrait, stepped at once into fame and fashion. He was forthwith appointed the court painter; and Philip IV. ordained that no one but Velazquez should paint the royal likeness.

Obtaining the king's permission to travel in Italy, he embarked at Barcelona, August 10, 1629. He visited Venice, Ferrara, and Rome, being everywhere received in an artistical triumph. Urban VIII. assigned to him an apartment in the Vatican, where he diligently copied Raphael and Michel Angelo; though their study never produced the slightest change in his style. He remained a year in Rome; and only sent home two original pictures, his Jacob with the Garment of Joseph, and Apollo at the Forge of Vulcan; both are now at Madrid. From Rome he passed to Naples, then a Spanish possession, where he derived much enjoyment from the works of Caravaggio, Stanzioni, and Ribera.

He returned to Madrid early in 1631, and there painted the magnificent equestrian portrait of Philip IV., from which a model cast in bronze by Pedro Tacca now exists in the gardens of the Buen Retiro. This success led to new honours: Velazquez was appointed to an office about the royal person, and in that capacity followed Philip into Arragon and Catalonia, in 1643 and 1644. In November, 1648, he made a second journey into Italy, in order to purchase modern pictures for the king, and procure moulds from the best antique statues for a projected academy. At Rome he painted the portrait of Innocent X., which is now the gem of the Doria collection, and was elected a member of the Academy of St. Luke.

We find him once more at Madrid in 1651, in the full power of his genius, and painting his finest pictures. In 1656 he received the much-coveted cross of Santiago, and about the same time was raised to the lucrative and honourable post of Aposentador Mayor. In 1660 he was sent to prepare the royal quarters during the journey from Madrid through the ill-provided Castiles to the Bidassoa. Worn out with the fatigue of this troublesome task, he fell sick, and died after a very brief illness, August 7, 1660. In less than a fortnight his wife, broken-hearted at his loss, followed her gentle and excellent husband, and was laid by his side in the church of San Juan.

His genuine and finest works remain at Madrid: in most Spanish cities they are quite as rare as in every other part of the world. There is no branch of the art, except the marine, which Velazquez has not pursued, and he attained almost equal excellence in all. His portraits baffle description and surpass praise. This great artist literally drew the minds of men: his characters live, breathe, and seem ready to walk out of the frames. He had a wide range of subjects, and was almost perfect throughout, whether painting high or low, rich or poor, young or old, human, animal, or natural objects. His dogs are equal to those of Snyders; his horses to those of Rubens. His beggars and urchins rival those of Murillo. Neither Teniers nor Hogarth ever came up to the wassail of his drunkards. But Velasquez is also indisputably the first landscape painter of Spain: every scene he has painted is full of local colour, freshness, and daylight, whether a verdurous court-like avenue or a wild rocky solitude. His historical pictures are pearls of great price.

VELEIA, 'the Pompeii of northern Italy,' an ancient city at the base of the Apennines, 23¼ miles south from Piacenza, and 45 miles from Parma by the existing roads. Under the Empire this place was a municipium. At some time, probably about the fourth century of our era, the town was destroyed by a quantity of earth and rocks being rolled over it. This catastrophe was probably caused by the waters of a small lake high up in the mountains of Moria and Rovinazzo, 2 miles from the city.

The first discovery on the spot was made in 1747, when the bronze tablet of Trajan, Tabula Alimentaria, as it is called, was found there. Excavations were made in 1760 by the order of the duke of Parma, when the foundations of the forum, and of other buildings, were discovered, with statues, medals, money, and small implements of various kinds. Another bronze tablet was also found which contains a portion of a Roman law for regulating procedure in Gallia Cisalpina. The

ruins which have been excavated show the plan of the forum and of the amphitheatre. In the former stood a basilica. The city was well provided with sewers and drains. The museum of Parma is rich in bronze statues, marble inscriptions, and in bronze stamps for marking goods or pottery, collected in the excavations.

VELEZ-MALAGA, a town of Spain, in the province of Malaga, is situated a mile and a half from the Mediterranean Sea, near the mouth of the river Velez, and has about 12,500 inhabitants. It is slightly elevated above the left bank of the stream, and is commanded by the neighbouring hills. The streets are wide, clean, and tolerably well paved. Velez-Malaga was taken from the Moors by Ferdinand on the 27th of April, 1487, after a siege of about a month. It contains two parish churches, many convents, several houses of charity, a prison, public granary, &c., and some fine squares and public promenades. The environs are exceedingly fertile, producing sugar, coffee, cotton, cochineal, large quantities of excellent fruits, wine, silk, oil, the sweet potato, &c. Velez-Malaga has always been celebrated for its fruits, particularly fine muscatel raisins, lemons, oranges, figs, and almonds. Its oil is considered the best in Spain. In the town are oil mills and manufactories of hats, soap, brandy, &c.; but its trade and population have greatly declined, owing to its not having a good harbour. The climate is very pleasant—being described by the Spaniards as 'that of heaven,' but it is very hot in summer. The remains of the Moorish castle and tower may still be seen.

VELITES (Lat. *velitor*, 'to skirmish'), the light-armed infantry of the Roman armies, so called from their agility and swiftness, and first instituted during the second Punic war. They were armed with javelins, bows, and slings; and their cuirass, casque, and shield were of a very light construction. Stationed in loose order before the army, they were employed when occasion required. Sometimes they were disposed before the front of the Hastati, sometimes dispersed up and down among their void spaces, and sometimes placed in two bodies in the wings. The Velites generally began the combat, skirmishing in flying parties with the first troops of the enemy, and, when repulsed, falling back by the flanks of the army, or rallying again in the rear. Their tactics corresponded, in some measure, with those of the skirmishers, or rifle corps, of modern armies.

VELLA, a genus of plants belonging to the natural order *Cruciferæ*. *V. annua* was found in the time of Ray on Salisbury Plain, but has not since been noticed. *V. pseudocytisus*, False Cytisus, or Cress-rocket, is a native of Spain. This shrub, though generally kept in a greenhouse, is sufficiently hardy to live during the winter in the border in a warm aspect.

VELLETRI (the ancient Velitræ), is a walled city of south Italy, 21 miles E.S.E. of Rome, on the railway to Naples. It stands on a height, commanding fine views of the sea, the Campagna di Roma, and the Pontine marshes; and has a town-hall, constructed by Bramante; a palace with a very handsome marble staircase, and an old cathedral. The Borgian museum and picture gallery, now in Naples, and the Propaganda College at Rome, were originally formed in the Borgian Palace of this town. The inhabitants, who are principally employed in agricultural pursuits, number about 10,000. The neighbourhood is celebrated for its wines. Velitræ was an important city of the Volsci, and the original residence of the Octavian family. Augustus was born here B.C. 63. On the hills to the N. Charles III. of Naples gained a victory over the Austrians in 1744, which secured the two Sicilies to the Spanish branch of the house of Bourbon. The modern town is surrounded by ruined walls and towers.

VELLORE, a town and fort of British India, in the presidency of Madras, and the residence of Tippoo Saib's family from 1799 until 1806, when a Sepoy mutiny there caused them to be removed to Calcutta. The town is large and populous, and lies to the S. of the fort, with which it is connected by outworks. The fort, which is also extensive, is surrounded by a deep wide ditch cut in the rock, and filled with water. It contains spacious barracks, military quarters, a church, and a curious pagoda, now used as a magazine. Though the heat at Vellore is very great, the climate is healthy, and debilitated troops from other stations recover strength when sent there. It is 80 miles S.W. of Madras by railway.

VELLUM. [PARCHMENT.]

VELOCIPEDE. An iron skeleton carriage for one or two persons, having three or four wheels according to size. It is light, compact, and symmetrical in appearance, and is propelled by treadles connected with the cranked axle, and sometimes by a hand lever also. The front wheel may be turned at pleasure, so that the rider may give any direction to the machine. This species of vehicle was invented by M. Drass at Mannheim, in 1817. It was improved by Mr. Knight in England, who received a patent for it, but it has never come into general use.

VELOCITY, the name given to the proper measure of the speed with which a change takes place. When the speed is always the same, the velocity is measured by the work done in a unit of time: thus we speak of 10 miles an hour, meaning that in every fraction of an hour the corresponding fraction of 10 miles is moved over. When the speed is not uniform, the proper measure of velocity requires the introduction of those considerations on which, as far as its principles are concerned, the Differential Calculus is founded.

VELVET, a variety of the silk manufacture, remarkable for the softness of its surface. This softness is owing to a loose 'pile' or surface of threads, occasioned by the insertion of short pieces of silk thread doubled under the shoot, weft, or cross threads. These stand upright so thickly as entirely to conceal the interlacing of the warp and shoot. The richness of the velvet depends upon the closeness of the pile-threads. The insertion of these short threads is effected in the following manner:—Instead of having only one row of warp-threads, which will be crossed alternately over and under by the shoot, there are two sets, one of which is to form the regular warp, while the other is to constitute the pile; and these two sets are so arranged in the loom as to be kept separate. The quantity of the pile-thread necessary is very much more than that of the warp-thread; and therefore must be supplied to the loom by a different agency.

If the pile-threads were worked in among the shoot in the same way as the warp-threads, the fabric would be simply a kind of double silk, but without any kind of pile; the pile-threads are therefore formed into a series of loops, standing up from the surface of the silk; and by subsequently cutting these loops with a sharp instrument, the pile is produced. Thin brass wires are temporarily woven in among the weft-threads, to assist in forming the loops; and by a delicate cut or scission made with a sharp instrument, the loops are cut and the wires liberated. Striped velvets are produced by some of the pile-threads being uncut.

Cotton is now employed, as well as silk, in the manufacture of velvet. The different varieties of velveteen are a kind of cotton-velvet. The imports and exports of silk velvet will be found set forth in the article SILK.

VENDÉE, a department in France, formed out of Lower Poitou and named from the river Vendée, is bounded N. by Loire Inférieure, N.E. by Maine-et-Loire, E. by Deux-Sèvres, S. by Charente Inférieure, and W. by the Atlantic. Its greatest length from N.W. to S.E. is 82 miles; its greatest breadth is 65 miles. The department comprehends the islands of Bouin, Noirmoutier, and D'Yeu. The area is 2600 square miles, and the population in 1861 was 395,695.

Coast Line.—The coast of this department is generally low, and forms, with the islands of Noirmoutier and Ré, the Bay of Bourgneuf on the N.W., and the Bay of Pertuis Breton on the S. The shore is lined with a broad zone of fens, a large portion of which has been reclaimed by means of dykes and canals, and is of remarkable fertility. The island of *Bouin*, which is insulated by the Dain and united to the mainland by a causeway, is about 7 miles long and about 4 wide. *Noirmoutier*, which protects the Bay of Bourgneuf to seaward, is about 12 miles long and 5 broad. It is separated from the mainland at its south-eastern extremity by a narrow channel, which is passable for horses at low water. The coast of the island is lined by sand-hills or by low flat rocks, and shoals extend far out to sea. The soil is very fertile; but some of the most productive parts are below the level of the water, from which they are protected by embankments. The products of the island include grain, pulse, fruit, salt, and good cheese. Oyster fishing and boatbuilding are actively carried on; and the inhabitants, who amount to about 6000, are excellent seamen. Noirmoutier was taken by the Dutch in 1674, and by the Vendéans in 1794. The isle *D'Yeu* is fortified, and lies farther out from the mainland, from the nearest part of which it is distant more than 10 miles: it is about 6 miles long and 3 broad. Its western coast is high and inaccessible; the eastern side is low and flat, affording ready and safe access to small boats. The whole island is a vast granitic rock, covered with a vegetable soil 3 feet in thickness in the lower part, but in the higher ground so thin as to leave the rock almost bare. About half the land is cultivated; the rest is a mere waste, affording scanty pasturage to a few head of cattle. The inhabitants are all engaged in fishing. A vast quantity of salt is made by evaporation in the salt marshes along the mainland and in the isle Noirmoutier.

Soil.—The interior of the department presents two districts, with very marked distinctions, namely, the *Bocage*, which comprises all the northern part from the Sèvre-Nantaise to the Fens; and the *Plain*, which includes the southern districts, and bears evidence of having once been submerged by the ocean. The Bocage takes its name from the quantity of timber with which it is clothed; not that there are many large woods, but every field is surrounded by a quickset hedge, in which trees are thickly planted, so that the country has the appearance of a forest. This district is hilly, especially in the east and north-east, where the Gatinais heights cross the department from Deux-Sèvres; the soil is poor, and the roads, with few exceptions, bad; here and there are extensive wastes covered with gorse and broom. The Plain, which covers about 300 square miles, is the most fertile district in the department; it has a strong clay soil, resting on limestone; sea shells are found on the surface and to a considerable depth below it. Although called the Plain, it presents considerable inequalities of surface.

Hydrography.—The department is drained by a great number of small rivers. The Vendée rises in the forest of Chantemerle in Deux-Sèvres, passes Fontenai and enters the Sèvre-Niortaise above Marans; it is navigable from a little below Fontenai. Its total course is about 46 miles. The Autise, which joins the Sèvre-Niortaise 2 miles above the mouth of the Vendée, is navigable for about 6 miles. The Sèvre-Niortaise is navigable all along the south of the department. The northern and north-eastern parts are drained by the Sèvre-Nantaise and the Boulogne, both tributaries of the Loire. [SÈVRES, DEUX; LOIRE INFÉRIEURE.] The Lay, which, with its affluents, drains the centre and S.W., has been made navigable for about 20 miles above its entrance into the Pertuis Breton. The Vie rises N. of Bourbon-Vendée, and enters the Atlantic below St. Gilles, whence it has a tide navigation of about 6 miles. The navigable canal of Luçon has a course of 10 miles from the town of Luçon, into the road of Aiguillon, south of which is a remarkable spit of land, projecting about 3 miles into the sea.

Climate and Products.—The climate varies with the elevation of the soil. The Bocage being hilly, has a colder temperature than the rest of the department; the air also is purer: the summer very dry, the winter wet. The summer of the Plain and the Fens is hotter and longer; the air of the coast is loaded with moist unhealthy vapours. The prevailing winds are the north and the south; the latter is the more frequent. The changes of temperature on the coast are sudden. The inhabitants, particularly those of the Bocage, are remarkable for the simplicity of their manners, and the strong mutual attachment subsisting between the owners and the occupiers of the soil. The strength of this affection has been proved more than once in modern times, in a manner very honourable to the parties themselves, but with very disastrous results. They made a chivalrous stand for the Bourbons during the French revolution.

The most improved methods of agriculture have not yet been introduced into this department, but the grain crops are more than sufficient for the home consumption, about two-thirds of the entire surface being arable land. Besides wheat, barley, oats, rye, millet, buckwheat, hemp and flax are grown in the Plain, and to a greater extent in the Fens. The grass-lands are extensive, amounting to about 300,000 acres, and the heaths and open pastures exceed 150,000 acres; they are chiefly in the Bocage and the Fens. The horses are small, but vigorous; a great number of mules and asses are bred. The cattle are hardy, but not handsome; many of the fat beasts are sent to the Paris markets. Sheep are numerous, and considerable quantities of wool are produced. The forests are inhabited by wolves, foxes, wild boars, badgers, &c. Small game also abounds, and the sea and river fisheries are very productive. The vineyards cover large tracts, and yield a considerable quantity of inferior white wine. The orchards are extensive; the apple, cherry, and chestnut are the principal fruits. The minerals include argentiferous lead, some coal, iron in great abundance, and a few other metals. There are quarries of excellent building and mill stones, and of granite. Clay, some of it fit for porcelain and fine ware, occurs in many places. The manufactures are not very important: the principal articles made being beet-root sugar, paper, leather, silk hats, salt, earthenware, coarse woollens and other woven fabrics. The inhabitants carry on an active

trade in corn, wine, wool, sardines, charcoal, timber, horses, fat stock, &c.

Divisions, Chief Towns, &c.—The department is divided into three arrondissements, which, with their subdivisions and population, are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1861.
Napoléon-Vendée, .	10	104	147,697
Fontenai, . . .	9	111	135,837
Les Sables-d'Olonne,	11	83	112,161
Total, . . .	30	298	395,695

The capital of the arrondissement of Napoléon-Vendée and of the whole department is *Napoléon-Vendée*, formerly *Napoléon-Ville*, and *Bourbon-Vendée*. The town, which occupies the site of the old castle and village of *Roche-sur-Yon*, is situated in 46° 40′ N. lat., 1° 25′ W. long., 235 miles S.W. from Paris, on a hill above the little river Yon, and has a normal school, a civil tribunal, and 8298 inhabitants. It may be said to owe its existence to Napoleon I., who, when its population was only 800, in 1805, chose it to be the site of the capital of the department, and authorized the erection of the necessary public buildings—for which purpose he granted 3,000,000 francs (120,000*l*.). It was named after him till the restoration in 1814, from which period it was called Bourbon-Vendée. In the centre of the town, and on the summit of the hill, is the Place Royale, a spacious rectangle bordered with rows of trees, and surrounded by good buildings; into this square the principal streets, which are straight, wide, clean, and well built, open. There are no industrial establishments of importance here, and scarcely any trade; but the hotels, coffee and public houses, are remarkably numerous for the size of the place. The chief buildings are —a handsome parish church with a peristyle of six Doric columns; the residence of the mayor, a beautiful structure in the Italian style; a market-house, which is a square building, surrounded by a peristyle supported on several steps; a theatre; the prefect's residence; the great barrack; and the hospital. The town also possesses a small public library; a society of agriculture, arts, and sciences; and a lyceum. The large feudal castle of Roche-sur-Yon, which was founded here prior to the Crusades, was dismantled by Charles IX. and Louis XIII., and entirely destroyed by the Republicans in 1793. *Chantonnay*, in the centre of a coal-field, 18 miles from Napoléon-Vendée, with a population of 3253: *Les-Essarts*, a wretched village, with 2838 inhabitants, and the remains of a fine old castle, 11 miles from Napoléon-Vendée: *Les-Herbiers*, a well-built thriving town of 3500 inhabitants, situated in a beautiful district, 22 miles from Napoléon-Vendée: and *Poiré*, at a little distance from the Vie, with a population of 3902, give names to some of the other cantons.

The chief town of the arrondissement of Fontenai, *Fontenai-le-Comte*, is situated on the slope of a hill above the left bank of the Vendée, in a fertile narrow plain between the Bocage and the Fens, has a civil tribunal, a communal college, and 7971 inhabitants. The town has a very pretty appearance, and is approached by four fine roads, leading from Nantes, Rochelle, Saumur, and Niort. The streets in the older portions are narrow and winding, but the newer quarters are open and airy. The principal buildings are the beautiful Gothic church of Notre-Dame, with a spire 266 feet high: the college, which is surrounded by walls and gardens, and has accommodation for 400 boarders; four convents, the hospitals, the barracks, prison, theatre, and the pretty fountain, whence the town has its name, near the ruins of the old castle of the counts of Poitiers. The trade of Fontenai in corn, timber, seeds, oak staves, coals, charcoal, provisions, and Bordeaux and Charente wines, for which Fontenai is an entrepôt, is greatly facilitated by the navigation of the Vendée. The only manufactures are linen and coarse woollen stuffs. The Republicans were defeated here by the Vendéans under Larochejacquelin, Lescure, and Bonchamps, May 24, 1793. *Chaillé-les-Marais*, on the Rochelle road, in the middle of the Fens, has 2487 inhabitants. *St. Hilaire-des-Loges*, a large village situated on the Autise, has a population of 2728. *Luçon*, a gloomy, unhealthy, and not very clean town, situated on the eastern edge of the Fens, and at the extremity of the Luçon Canal (which is navigable for vessels of 60 tons), gives title to a bishop, and has 5637 inhabitants, who trade in corn, beans, timber, oak staves, coarse pottery, wine, &c. Manufactures of linen fabrics, porcelain, animal manures, and oil seed, are also carried on. The town is the residence of a British vice-consul, and has a communal college, diocesan seminary, &c. The cathedral is a large Gothic building, with three naves, and a fine open lofty spire. More than 5000 tons of phosphate of bones are annually imported; the principal exports are grain, dry vegetables, linseed cake, colza oil, and oak timber for the imperial navy. Cardinal Richelieu was appointed to the bishopric of Luçon at the age of twenty-two. The Vendéans were defeated here by the republicans, June 28 and October 1, 1793. *Pouzanges*, a pretty little town N. of Fontenai on the western slope of the Gatine hills, has a handsome church, a Protestant temple, and 2572 inhabitants.

The arrondissement of Les-Sables-d'Olonne takes its name from its chief town, *Les-Sables*, which is situated on a sandy peninsula on the coast, and consists of several long, clean, and well-paved streets. The southern part of it stands on a slight eminence; the suburb of La-Chaume, built on a level rock, is separated from the port by a canal. None of the buildings are remarkable, but the place is important on account of its good harbour, which admits vessels of 150 to 200 tons, and is a haven of refuge on a very dangerous coast. The entrance of the port is defended by batteries, and the town itself is slightly fortified. Les-Sables has two light-houses, a civil tribunal, a college, and 6996 inhabitants. Corn, wine, salt, pitch and tar, fresh and salt fish, especially pilchards and sardines, are the chief articles of trade. Shipbuilding is carried on, vessels being built and fitted out for the Newfoundland fisheries: and the coast fisheries are actively plied. *Beauvoir*, formerly washed by the sea, and hence surnamed *sur-Mer*, though it is now 3 miles inland, is situated opposite the island of Noirmoutier, and has a harbour for vessels of 80 tons, which reach the town by a canal. The population is 2616, who trade in salt, corn, and timber. *Challans*, situated in the Fens, N. of Les-Sables, has a population of 4178. *St.-Jean-de-Mont*, a large village near the Atlantic, 33 miles N.N.W. of Les-Sables, has a population of 4021. *Noirmoutier*, a small seaport in the N.E. of the isle of that name, has a fortress, a harbour, into which vessels of 200 tons can enter, and 6248 inhabitants. The island contains rich saline marshes, and salt is the chief export. The imports include wines, wool, building materials, and colonial produce. Upwards of 1000 craft enter the port annu-

ally. *Talmont*, situated on a hill near the coast, and close to the great salt marshes, has 980 inhabitants.

The department forms the see of the bishop of Luçon; it is comprised in the jurisdiction of the Imperial Court and Academy of Poitiers, and in the fifteenth Military Division, of which Nantes is head-quarters. It returns three deputies to the Corps Legislatif. (*Dictionnaire de la France; Annuaire pour l'An* 1868).

VENDOME. [LOIR-ET-CHER.]

VENDOR AND PURCHASER. Contracts for the sale and purchase of land or other real estate may be entered into either privately between the parties, or upon a sale by auction. At common law, agreements for the purchase of real estates might be made by parole, but by the Statute of Frauds (29 Car. II. c. 3, ss. 1, 2, 3, and 4), 'All leases, estates, interests of freeholds, or terms of years, or any uncertain interest of, in, or out of any messuages, manors, lands, tenements, or hereditaments, made and created by livery and seisin only, or by parole only, and not put in writing by the parties so making or creating the same, or their agents thereunto lawfully authorized by writing, shall have the effect of leases or estates at will, any consideration for making any such parole leases or estates notwithstanding.' But leases not exceeding three years, whereupon the rent reserved should amount to two-thirds of the full improved value, were excepted. The Act requires the assignment, grant, and surrender of existing interests to be in writing, and enacts that 'no action shall be brought whereby to charge any person upon any agreement made upon any contract or sale of lands, tenements, or hereditaments, or any interest in or concerning them, unless the agreement upon which such action shall be brought, or some memorandum or note thereof, shall be in writing, and signed by the party to be charged therewith, or some other person thereunto by him lawfully authorized.' The note or memorandum of agreement may be any writing, such as a letter.

Upon sales of estates by public auction, the highest bidder, upon being declared the purchaser, is considered to have entered into a contract for purchase according to the particulars and subject to the conditions of sale; and the auctioneer, who is for this purpose considered as the agent of both vendor and purchaser, is thereupon authorized to sign an agreement of purchase. The writing down the purchaser's name upon any memorandum of sale at the time of the bidding is a sufficient signing. Sales by auction of lands are within the above-mentioned enactments of the Statute of Frauds; but sales before a master under a decree of a court of equity will be carried into execution, although the purchaser did not subscribe any agreement; for the judgment of the court in confirming the purchase takes it out of the statute. An auction duty of 7*d.* in the pound was formerly payable upon all sales by auction of any interest in freehold, copyhold, or leasehold lands, tenements, houses, or hereditaments; but it was abolished by the 8 Vict. c. 15. The subject of the sale and purchase of estates is discussed at length in Lord St. Leonard's 'Treatise on the Law of Vendors and Purchasers of Estates.'

The Statute of Frauds does not extend to Scotland. There, at common law, writing is essential to all sales of heritages, and also of leases of land or contracts of service for a term exceeding one year. Sales of moveables to any extent may be proved by parole, but claims for the price of goods after three years fall under the triennial prescription, and resting owing of the debt can only be proved by the writing or oath of the defender.

VENEERING is the art of laying thin leaves, called *Veneers*, of a valuable kind of timber upon a ground or foundation of inferior material, so as to produce articles of elegant appearance at smaller cost than if they were composed entirely of the ornamental wood. Small veneers are cut by hand with a thin saw, the block being held firmly in a vice; but large ones are usually cut by machinery. They are carefully brought to the right thickness by fine planes; fashioned precisely to the required shape; and then glued down to the substratum (which should be of dry wood), with strong glue. Precautions are taken to prevent the veneer from springing or loosening before the glue is dry. The work is afterwards finished with very fine planes and scrapers, and polished with fish-skin, wax, and a brush or polisher of shavegrass.

Before saw mills were made applicable for this purpose, the elder Brunel devised a mode of cutting timber into veneers by a kind of knife, which answered well for straight-grained and pliant woods, such as Honduras mahogany, but not for other kinds.

Ivory veneers, or rather thin sheets for miniatures and for memorandum books, are sometimes not more than one-sixtieth of an inch in thickness, requiring much nicety in their manipulation; and wood veneers as thin as paper are frequently produced. Vulcanite, or vulcanized india-rubber, is now also used as a veneer. It is rolled into thin sheets, which may be either plain or embossed, and it receives a polish by the rolling. In applying this substance, the sheets are dipped for a few minutes in boiling water, till they become as tractable as moist paper, when the workman can fasten them round and over the sharpest curves and angles. Ordinary wood veneers cannot well be bent round corners; and though a patent to effect this has been taken out, in general it is not attempted.

The Americans have recently introduced veneering of a remarkable kind under the name of *pressed work*. Instead of a thin veneer being placed upon a thicker substratum, the whole substance consists of veneer. It comprises four, six, eight, or any other number of layers. Some strong plain wood, such as black walnut, is selected for the interior layers, and rosewood or other fancy wood for the exterior. The veneers, of the usual thickness, are well saturated with glue, and placed one upon another, with the grain of each layer at right angles to that of the next. The mass, while hot, is placed in moulds, named *cawls*, and pressed forcibly for twenty-four hours. When taken out, the wood is found to be firm, elastic, and strong, and to conform to any curvature which the mould may have given to it. On account of the crossing of the fibres it can scarcely split, except by a force that would rend it to pieces, and the pores have become so filled with glue, as to add in a remarkable way to the strength of the substance. Chairs, the framework for bedsteads, and even the bodies of musical instruments, are made in this way, and are in great demand for their strength and singular lightness. The art was introduced by Mr. Belter.

M. Bogand has succeeded in producing *dished* or *spheroidal* pressed work; that is, articles in wood presenting much deeper curves than those just described; but to effect this the cutting must be very accurate, and can only be done by an apparatus mathematically adjusted. A curve of double curvature may thus be produced, but hitherto this dished work has been very expensive.

A method of veneering in relief has been invented by M. Amies, by which medallions are produced, remarkable for the sharpness and perfection of the device.

VENE'RIDÆ, a family of *Conchifera*. Lamarck divides this group into two sections, viz.: 1, *Conques Fluviatiles* (genera, *Cyclas*, *Cyrena*, *Galathea*); 2, *Conques Marines* (genera, *Cyprina*, *Cytherea*, *Venus*, *Venericardia*).

Dr. J. E. Gray places the *Veneridæ* as the first family of his order *Phyllopoda*, with the following genera:—*Artemis*, *Cytherea*, *Meroe*, *Gratelupia*, *Trigona*, *Chione*, *Circe*, *Dosina*, *Mercenaria*, *Anomalocardia*, *Cypreria*, *Venus*, *Tapes*, *Venerupis*, and *Clementia*. The *Veneridæ* are immediately followed in Mr. Gray's arrangement by the *Cyrenidæ*, which comprise the genera *Cyrena*, *Geloina*, *Velorita*, *Cyclas*, and *Pisidium*. The *Cardiadæ* immediately follow. The *Conchifera* are now arranged in three sections, namely, *Asiphonida*, *Siphonida Integro-pallialia*, and *Siphonida Sinu-pallialia*. The family *Veneridæ* stands under the last, and contains the following genera:—*Venus*, *Cytherea*, *Meroe*, *Trigona*, *Gratelupia*, *Artemis*, *Lucinopsis*, *Tapes*, *Venerupis*, *Petricola*, and *Glaucomya*.

VENETI. [MORBIHAN.]

VENETIA or VENEZIA. [VENICE.]

VENETIAN SCHOOL OF PAINTING. The historians of Venetian art date the commencement of modern painting in Venice from the eleventh century, or about 1070, when the Doge Selvio invited some Greek mosaic-workers to Venice to adorn the church of St. Mark; and in the thirteenth century, after the capture of Constantinople by the Venetians, in 1204, not only works of art, but artists also, Venetians as well as Greeks, are said to have been plentiful in the island city. Only two, however, of the former can now be named, Giovanni da Venezia and Martinello da Murano.

It was not until after the time of Giotto that the painters of the Venetian states began to distinguish themselves. The oldest known works at Padua are by artists of his school. The frescoes in the church of San Giovanni Battista at Padua are attributed to Giusto Padovano, a scholar of Giotto and a Florentine by birth, though naturalized at Padua. Guariento of Padua was also a follower of Giotto, and was celebrated about 1360; some of his works are still remaining. There were some artists about this time in Venice and Treviso who painted in what may be termed a national style; and among these may be included the miniature painters, who were then numerous.

In the fifteenth century a very different style prevailed; and although the artists of this period still designed with great stiffness and in the Gothic taste, they produced many admirably-coloured pictures as regards the brilliancy and composition of colour, while in the local colours and reflexes they were yet deficient. The leaders of the improved style were some painters of the small island of Murano, and it has the glory of having been the nursery of the greatest Venetian masters: Titian studied at Murano. The first painters of this place were Quirico, Bernardino, and Andrea da Murano; but its great ornaments were the Vivarini. The principal contemporaries and rivals of the latter in Venice were Jacopo Nerito of Padua and Nasocchio di Bassano the elder, both scholars of Gentile da Fabriano, who was employed in Venice at the beginning of the fifteenth century; also Jacopo Bellini, Francesco del Fiore and his son Jacobello del Fiore, and Morazone; and Donato and Carlo Crivelli, scholars of Jacobello del Fiore.

Besides the painters already mentioned, there were others of equal merit in other parts of the state, in Bergamo and Brescia. The greatest master, however, of this period was Francesco Squarcione of Padua, who formed there the most illustrious school of painters ever brought together by one man. Only a single work at Padua is known to have been done by Squarcione, and it was painted for the Lazara family in 1452; it is excellent in colouring, in expression, and in perspective. Mantegna, Marco Zoppo, and Jacopo Bellini were his scholars.

About 1470 a great change took place in the Venetian method of colouring. The old methods of painting in distemper (à tempera), and with gums, &c. (à guazzo), were laid aside for what is now generally called oil painting, which was introduced into Venice by Antonello da Messina, who had learned it in Flanders of John van Eyck. Roger of Bruges, another scholar of Van Eyck, is said also to have visited Venice. The first Venetians who distinguished themselves in the new method were the Vivarini and the Bellini. Giovanni Bellini acquired the reputation of being the most distinguished painter of his time in Venice; he flourished from 1464 until 1516.

Whilst the artists of the neighbouring cities of Venice were, with more or less success, contentedly following the dry manner of Bellini, it was completely exploded in the capital by two of his own scholars, Giorgione and Titian. [GIORGIONE; TITIAN.] The following celebrated masters were among the scholars of the former: Sebastiano del Piombo, Giovanni da Udine, Francesco Torbido, called Il Moro, Pietro Luzzo, and Lorenzo Luzzo. The imitators of Titian were likewise numerous, but his scholars are very few. Two of his most celebrated followers were Girolamo di Tiziano and Bonifazio of Verona, though called Veneziano by Vasari and others. To enumerate the followers of Titian or Giorgione, or those who imitated the characteristics of their styles, would be to enumerate nearly all the painters of Venice of this period, besides many of those of the neighbouring cities.

It remains yet to mention three of the greatest ornaments of the golden age of Venetian painting, as this period is justly entitled. [BASSANO; CAGLIARI; TINTORETTO.] Cagliari, or Paolo Veronese, as he was called, was the real master of Rubens. Verona had at this time three other painters little inferior to Paolo himself: Battista d'Angelo, called Del Moro, scholar and son-in-law of Torbido; Domenico Ricci, called Brusasorci; and Paolo Farinato, called degli Uberti. Of the assistants and scholars of Paolo the most distinguished were his brother Benedetto Cagliari, who generally painted his architecture for him; his son, Carlo Cagliari, called Carletto, who died young; Gabriele Cagliari, likewise his son; and Battista Zelotti, the most distinguished of all his pupils.

After the time of the great masters just spoken of, in the seventeenth century, the Venetian school of painting declined as much and as rapidly as the Florentine did after the death of Michel Angelo. Many of the Venetians of this period, apparently mistaking brilliancy for art, cultivated little besides colour, and many of their pictures are mere compositions of silks, satins, and other stuffs. Jacopo Palma the younger (born 1544, died about 1628) holds a middle place between the great painters of the last period and the mannerists of this. Lanzi calls him the last of the good age and the first of the bad. In 1630 and 1631 many painters were carried off by the plague, which visited Venice in those years; and traces of the excellencies of the great masters were after that time still more rare in the works of the surviving Venetian painters. In the middle of the seventeenth century the style of M. A. Caravaggio and the Naturalisti began to prevail there, and several foreigners

supplanted the national painters in public estimation in Venice itself. [CARAVAGGIO.] Of these Naturalisti and Tenebrosi, Pietro Ricchi of Lucca, called Il Lucchese, was one of the best.

At the end of the seventeenth century no particular style prevailed in Venice, and all the various classes of painting had their votaries: landscape, architecture, battle, and marine painters, were alike numerous. Giambattista Tiepolo was the last of the Venetians who in the seventeenth century acquired a great name.

One of the most famous painters of the eighteenth century, who, though he was not a Venetian, was first educated at Venice by Cervelli, was Sebastiano Ricci, or Rizzi. He had several celebrated scholars. The following were also highly distinguished:—Antonio Zifrondi of Bergamo was a painter of remarkable facility of execution; and Fra Vittore Ghirlandi and Bartolomeo Nazzari, of the same place, were both excellent portrait painters. In Brescia Avogadro Bresciano and Andrea Toresani were distinguished for rich colour, elegant composition, and good drawing. Simone Brentana, though a native of Venice, was domiciliated at Verona, and painted many excellent works there. Of the latter town also was Antonio Balestra. The last of the distinguished painters of Verona was Giovanni Bettino Cignaroli.

Santo Prunati of Verona, contemporary with Balestra there, was also a good painter; and Pietro Uberti at Venice excelled in portraits. A very distinguished painter also of this period at Venice was Antonio Canaletto, known throughout Europe for his views in Venice, and other cities in and out of Italy. He has always been a favourite with English collectors. [CANALETTO.]

VENEZIA'NO, ANTO'NIO, was born, according to Vasari, at Venice about 1309, but Baldinucci believes him to have been a Florentine. He studied with Angelo Gaddi at Florence. At Pisa he completed the series of the life of San Ranieri, in the Campo Santo, which had been commenced by Simone Memmi. Vasari considers the frescoes of Veneziano in the Campo Santo at Pisa to be the best paintings there. Most of his other works have perished. Late in life he turned physician, and died of the plague at Florence, in 1384, the victim of his desire to save others.

VENEZUE'LA, a republic in the N.E. of South America, is situated between 1° 8′ and 12° 16′ N. lat., and between 58° 16′ and 73° 20′ W. long. It is bounded N. by the Caribbean Sea, W. by New Granada, S. by Brazil, and E. by British Guiana and the Atlantic Ocean. The area is 426,700 square miles, or double that of France; and the population, in the latest return, is stated to be 1,564,433—including about 50,000 independent Indians. The name Venezuela means 'Little Venice,' and the country was so called by the Spaniards in 1499, when they discovered a native village near Lake Maracaibo built on piles (in order to avoid inundations), which gave it the appearance of a miniature Venice.

Sea-coast and Islands.—The Boca de Navios, or principal mouth of the river Orinoco, is the most eastern point of the sea-coast of Venezuela. From thence the shore extends W.N.W. to the innermost recess of the Gulf of Paria, a distance rather exceeding 200 miles. The whole of this tract is very low, and a part of it is covered by the sea at high water. The Peninsula of Paria, which divides the gulf from the Caribbean Sea, is occupied by a ridge of high rocks. Another rocky peninsula extends westward as far as the town of Cumana, between which and Barcelona, about 72 miles, the coast is of moderate elevation. From Barcelona to Cape Codera, a distance of about 128 miles, the shore is low and sandy; but between Cape Codera and Puerto Cabello, about 155 miles, it is very high. From Puerto Cabello to La Vela de Coro it is 165 miles, generally low and sandy. Farther west, to the limits of Venezuela, the shores are mostly low, sandy, and in some places covered with swamps or lagoons. The whole coast-line of the republic extends about 1580 miles.

The chief harbours are those of Cumana, at the S. side of the Gulf of Cariaco, capacious enough to receive and shelter all the fleets of Europe; and Puerto Cabello, which is also roomy and secure.

Within the jurisdiction of Venezuela are numerous islands, both large and small, on the northern coast, in the Caribbean Sea. The chief of these is Margarita, which constitutes a province in itself; and is 40 miles long by 20 wide. The others, mostly uninhabited, are the resort of innumerable sea-fowl. Some of them contain valuable deposits of guano, of excellent quality—the exclusive privilege of removing which has been granted by the government to a company established in Philadelphia.

Surface and Soil.—Venezuela contains three distinct mountain regions, extending respectively over the N.W., the N.E., and the S.E. The N.W. parts are occupied by the Andes and the mountains of the coast, which are connected with the Andes; the N.E. districts are mostly covered by the ranges of the Sierra de Bergantin; and the S.E. region comprehends the western portion of the Sierra de Parima. These mountain ranges are separated from one another by plains. The former occupy about 90,000 square miles, whilst the latter extend over about 310,000 square miles.

The chain of the Andes is a continuation of the most northern portion of the eastern Andes of New Granada, before leaving which it divides into two branches—the E. and the W. The former enters Venezuela on the S., and stretches N.E. for more than 300 miles. It forms an enormous mass of rocks, occupying with its declivities a mean width of more than 60 miles; and the highest portion is generally a narrow table-land, so elevated that no trees or bushes are found on it, but only a few hardy alpine plants. These table-lands, called paramos, are from 10,000 to 12,000 feet above the sea-level, and there are several summits above 14,000 feet high. The loftiest peak in the Nevado de Merida is 15,300 feet above the sea, and is always covered with snow. Where cultivation has been attempted on the slopes of these mountains it succeeds to a height of 8000 or 9000 feet—the line which separates the cereal crops of temperate climates (wheat, barley, &c.), from tropical productions (maize, coffee, the yuca, &c.), being at an elevation of about 4000 feet. The W. branch of the Andes runs into Venezuela much further N., and extends to the coast at Cape Chichibacoa. It has but a moderate elevation, rarely exceeding 4000 feet, and is nowhere cultivated. The thick forests which cover it in its whole extent shelter the independent Indian tribes, the Cucinas and the Goajiros. Between these two ranges lies the basin of the Lake of Maracaibo. This lake, the largest in South America, is 92 miles long, and the channel by which it is connected with the Caribbean Sea is 46 miles, so that it really extends 138 miles from south to north. Its greatest width is 82 miles.

The Coast Range (Sierra Costanera) begins where the Andes terminate on the left bank of the Cojedes, an affluent of the Portuguesa. The mountains themselves do not constitute a large mass of rocks, but divide into several ridges, and their elevation sinks to nearly half

the height of those south of the Cojedes, though the Silla de Caracas rises to 8600 feet, and forms a conspicuous object from the sea. Between this high ground and the sea on the north spreads a tolerably level tract, several miles wide, but on the east along the shores of the Golfo Triste the hills come close up to the water at several places. The eastern portion of the Coast Range is composed of two well-marked ridges, and of one which is frequently interrupted. The country inclosed by the two parallel ridges contains the lake of Tacarigua, which extends from W. to E. about 30 miles, and 13 from N. to S. in the widest part. It has no outlet; and being inclosed by mountains, presents the most diversified and beautiful scenery. The N. shores are very fertile; but on the S. is a desert.

The mountain region called Sierra del Bergantin, which occupies the north-eastern portion of the republic, and is sometimes considered as an offshoot of the Coast Range, is of comparatively small extent. Its length is about 180 miles, and its width varies between 50 and 10 miles. The valleys and table-lands of these heights near the coast are the chief seats of cultivation in Venezuela, and form the most populous region of the torrid zone in the New World.

South of the mountain regions hitherto mentioned are the Llanos, or Plains, which lie between the Orinoco and the Andes, and cover an area estimated at above 150,000 square miles. This tract, though one immense plain, presents a great variety in elevation, climate, rivers, and productive powers. Some districts are hardly elevated above the sea, whilst others rise to nearly 1300 feet: some are arid deserts, while the vegetation of others is extremely vigorous nearly all through the year. The whole, however, is characterized by a want of forests. Farther W. lie the table-lands, or Mesas, which constitute a peculiar feature in this part of the country. The surface is quite level: the soil, consisting chiefly of sand, is unproductive, and the rains do not fertilize the ground, but give origin to a hundred rivers, running S. to the Orinoco, E. to the Gulf of Paria, and N. to the Caribbean Sea. The country between the table-land and the Caribbean Sea extends about 60 miles from N. to S., and is a level plain, fit only for pasture. The plains of Barínas [VARINAS] are considered the most fertile part, and the best adapted for cultivation. These extend along the base of the Andes from the Rio Portuguesa to the Rio Sarare and Apure, a distance of more than 150 miles, and are from 60 to 80 miles wide. Between the Rio Apure and the Rio Meta, both affluents of the Orinoco from the west, are the Llanos of Apure, the lowest portion of the great plains. In the summer this is one vast pasture ground; but after the rains the whole is flooded by the rivers over a surface equal to the entire area of the British islands. In the dry season the greater part of the llanos presents to the view a bare sunburnt desert, over which the least agitation of the air whirls clouds of dust; and the intense heat from the naked ground, the want of landmarks, the frequency of extensive mirage, and the difficulty of finding water, then render a journey through them a dangerous undertaking. But no sooner does the rain fall—and it pours down with the violence peculiar to the tropics—than the scene changes totally; vegetation springs forth and spreads itself abroad with surprising rapidity, the arid waste becomes a rich garden, the moistened earth is seen to heave and open, and the crocodile and the boa-constrictor come forth, shaking off their lethargy, and releasing themselves from their temporary imprisonment. The rivers, hitherto dry, are now quickly filled, and

their banks being low, the waters spread over the llanos, forming great seas, which, towards the foot of the Andes, penetrate even into the majestic forests. The plains above the level of the inundation feed cattle and horses in great numbers.

South of the Rio Meta begins a woody region, which extends southward to the limits of Brazil, and may be considered as the northern portion of that immense forest which occupies South America on both sides of the equator. It is very imperfectly known, except along the banks of the Orinoco.

In the southern part of the republic, on the frontiers of Guiana, and between the Orinoco and the Amazon, rises an insulated group, called collectively the mountains of Parima, which are divisible into several chains, and extend for the most part E. and W. This extensive region still remains unexplored—a wilderness overgrown with superb forests. It is known, however, that the hills nowhere attain the elevation of the *paramos*, so that their summits, if cleared of trees, would be capable of yielding the grains of Europe. The interior has been traversed only by a few adventurers, who have followed the course of the large rivers in search of the famous El Dorado. This was the object for which the expedition of 1595 was sent from England under Sir Walter Raleigh; and its failure contributed to his unjust doom upon the scaffold.

Rivers, &c.—Venezuela is almost everywhere well watered. Its principal river is the Orinoco, into which flow about 400 tributaries, many of them navigable. The Orinoco itself holds the third rank among the great rivers of South America, and the exuberantly fertile valley of this noble stream, which, with its affluents, waters a territory of 150,000 square miles, offers all the natural conditions of an opulent and populous state. The rivers which have a course of at least 100 miles within the limits of the republic, are about sixty in number. The greater part of them join the Orinoco, which, with its chief tributaries, is noticed elsewhere. [ORINOCO.] The southern portion of Venezuela is drained by the Rio Negro, which in its upper course is called Guainia. It is joined from the north by the Casiquiare, a branch of the Orinoco, connecting that river with the Amazon. This natural channel is 248 miles long, in general 30 feet deep, and on the average about 400 yards wide. The rivers which fall into the Caribbean Sea without joining the Orinoco, Rio Negro, or Essequibo, have a comparatively short course. The Guarapiche rises in the mountain system of the Bergantin, and falls into the Gulf of Paria. It runs about 180 miles, of which more than 70 are navigable. The Neveri rises in Mount Turumiquire, runs about 60 miles, and is navigable for small boats for 40 miles. The Unare, rising in the Mesas, flows about 170 miles, and is navigable for 90. The Tui, which drains the principal valley of the coast range, is navigable for more than 80 miles, its total length being 190. The Tocuyo rises on the northern declivity of the paramos of Niguitao and of Rosas, and falls into the Golfo Triste after a course of 330 miles, of which more than 150 are navigable. Venezuela contains above 200 lakes or lagoons, but most of these are the results of inundation, being only marshes more or less permanently covered. Only two of the whole number —those of Maracaibo and Tacarigua—are deserving of notice for their extent or beauty.

Climate and Productions.—The climate of Venezuela exhibits in the highest degree the equatorial character, and earthquakes are frequent. The change of seasons is scarcely perceptible, and vegetation goes on perpetually.

On the coast the thermometer ranges from 80° to 90° Fahr. all the year round; but notwithstanding this continuous heat epidemic diseases are rare. To those unacclimatized, however, care is necessary, as a too great exposure and inattention to diet are often followed by violent fevers. The table-land bordering on the shore enjoys an almost uniform temperature of from 70° to 80° throughout the year. The llanos—especially those portions subject to inundation—are unhealthy. With respect to temperature, Venezuela is divided by the natives into three zones, called Tierras Calidas, Tierras Templadas, and Tierras Frias. The Tierras Calidas ('hot countries') are all those which do not rise more than 2000 feet above the sea, and in which only tropical plants and fruits succeed. The Tierras Templadas ('temperate countries') are between 2000 and 7000 feet above the sea: the agricultural productions of Europe thrive best in this district. The Tierras Frias ('cold countries') are those which, from 7000 feet above the sea-level, rise to the summit of the Sierra Nevada de Merida. Their average temperature is 49° Fahr., and they are mostly uninhabited. Only two peaks in Venezuela are above the line of permanent snow. Here, as in other countries between the tropics, the year is divided into the wet season and the dry season. The former is called the winter, though the heat is then greatest, as the sun passes twice over the zenith; whilst during the dry season, which is called the summer, the sun is in the southern hemisphere. The north-east trade-wind, which blows the whole year round in this country, is modified in its direction and force by these seasons.

The articles of cultivation grown for exportation are cotton, indigo, cocoa, coffee, sugar, tobacco, and cocoa-nuts. The quantity of coffee alone which is exported amounts to 800,000 bags annually. Indigo, which was once the most important object of cultivation, is much neglected, and coffee, cotton, and sugar have taken its place. The cocoa-nut is very generally grown along the coasts for the sake of its oil, and is found to be very remunerative in suitable situations. The tobacco is of the best quality, and includes the well-known Varinas, so much esteemed in Europe. Wheat is produced only in the more elevated tracts; but maize is extensively cultivated all over the country, and near the coast it is gathered in about four months, so that two crops of it are easily obtained in the year. Millet is also raised; and rice is grown in a few places in the lower tracts. Barley succeeds only on the declivity of the Andes. The plantain supplies the staple food of the great majority of the population. The species of this tree are numerous, and some of them thrive at an elevation of 5000 feet, but lower down they are more prolific, and continue bearing for eighty years, being loaded with fruit at all seasons. The yuca is cultivated chiefly by the Indians, who prepare from the roots the farinaceous meal called manioca. Among the large timber the mahogany, satin and rose woods, ebony, and many varieties of palms are the most important. Sarsaparilla, dragon's-blood, copaiba, and other drugs, besides *caucho* or caoutchouc from several trees of different kinds, are all produced in this country. There are large forests of the cinchona, or Peruvian bark tree; and vegetables are raised in great variety. The cow tree is so named from its yielding a pleasant milk when pierced.

The domestic animals constitute one of the principal branches of the wealth of Venezuela. The large plains supply pasture for cattle, horses, mules, and asses, and the number of these is very great. Sheep and goats

are also generally kept, but are only numerous in one or two districts. Pigs abound in the valleys of the mountain ranges and the countries contiguous to them.

The principal wild animals include the jaguar, puma, ounce, tiger-cat, monkey, tapir, capybara, porcupine, sloth, and ant-eater. The titi, a diminutive monkey only 6 inches in length, is a species peculiar to this country, and the most elegant varieties of it are found only on the banks of the Casiquiare. The vaquira, a kind of wild hog, though much smaller than the tapir, is more formidable, and when in large herds fearlessly attacks the hunter. The jaguar or American tiger, being hunted for the sake of its highly-prized skin, is growing rare. Immense herds of wild cattle roam over the plains; and they are slaughtered in vast numbers for their hides and tallow. The chiguire—an amphibious animal resembling a large otter—is often domesticated in ponds for the sake of its flesh, which is deemed to be fish, and is eaten during fasts. Besides dolphins of great size which ascend the rivers, the manati, often weighing 800 lbs., is found in the Orinoco and its affluents at the foot of the Andes, as well as in Lake Maracaibo. The birds are numerous, especially those belonging to the *Falconidæ*, *Ardeidæ*, *Strigidæ*, *Psittacidæ*. There are also pelicans, wild geese and ducks, and flamingoes. The alligator abounds in the Orinoco, Apure, and Portuguesa, and is likewise found in several other rivers. The iguana is eaten, and considered a dainty. Crocodiles, rattlesnakes, boa-constrictors, and several kinds of venomous snakes, are met with.

Venezuela is not rich in minerals. Gold, silver, tin, copper, iron, and lead occur; but only gold and copper are worked profitably. Coal, natron, salt, petroleum, and asphalt are found in different places. About 100,000*l.* worth of gold—the produce of the mines of Caratal—was exported in 1866.

Inhabitants.—The population consists of aborigines, of the Spaniards and Africans who have settled in the country, and of the offspring which has resulted from the mixture of these three nations. The aborigines are generally copper-coloured, some being very dark, whilst others are almost as fair as Europeans. The greater part of them cultivate cotton, plantains, yuca, batatas, and even the sugar-cane. They live in houses, but all of them go nearly naked. More than one-third of the inhabitants are people of colour, i.e., mestizoes, mulattoes, zambos, and other mixed breeds. The creoles, or people of European descent, amount to about one-fourth; and the domesticated Indians number about one-sixth. The aborigines and coloured inhabitants are docile and industrious; and are the manufacturers, miners, and agriculturists of the country. The besetting sin of the other races is indolence, which much retards their social progress. The 50,000 independent Indians add nothing to the strength or resources of the state. They are divided into at least 100 different nations or tribes, some of them consisting of not more than 100 people, and speaking apparently different languages, which are doubtless but dialects derived from a comparatively few tongues. Among the nations which may be regarded as parent stems of this various and alienated progeny, that of the Caribs holds the first rank. These are tall, strong, courageous, and intelligent. The Ottomacs, in the plains of the Apure, are a wretched tribe, remarkable for their extreme addiction to the savage habit of eating clay. By a decree dated March 10, 1854, passed by the Congress of Venezuela, and sanctioned by José Gregorio Monagas, the president of the republic, slavery was totally abolished.

Government, Manufactures, Commerce, &c.—The constitution devolved on Venezuela by the parent republic of Columbia is a slightly modified copy of that of the United States. The government is vested in a Senate and House of Representatives; the executive power being in the hands of a president and vice-president. The inhabitants enjoy entire personal freedom, and the press is also free. Capital punishment has been abolished. The Roman Catholic religion is the religion of the state, but other creeds are tolerated. The clergy are held to be strictly subordinate to the civil power. The papal sanction, when required, is transmitted through the government, which also administers the patronage of the church. Education was formerly much neglected, but of late years it has become more general. The revenue and expenditure of the republic cannot be satisfactorily ascertained. At the close of the revolution, the debt contracted by loans in England alone amounted to six and a half millions sterling; and owing to the frequency with which the government has broken its engagements, Venezuelan bonds are now (1868) comparatively worthless—no interest having been paid on them since 1864. The republic has no metallic currency of its own, and the monies of all nations are in circulation. The ranks of the army are filled with Indians and mixed races, in a tolerable state of discipline; and in addition to these there is a militia, consisting of the whole male population from sixteen to forty years of age. The maritime force is inconsiderable.

The few manufactures of the country are in the Sierra Nirgua, and on the declivities of the Andes, at Tocuyo, Barquicimento, Trujillo, and Merida, where straw hats, hammocks, coarse cotton cloth, some worsted stuffs, and earthenware are made. Agriculture is the usual occupation of the people; but scarcely one-tenth of the fertile districts has yet been brought under cultivation. The commerce of the country is important, but is much restricted, owing to the absence of good roads or other means of transit. The trade is principally with the United States, Great Britain, France, Germany, and Spain. An American company, with the exclusive privilege of navigating the Orinoco, has three steamers plying regularly, which carry large quantities of produce from the interior. The Lake of Tacarigua is likewise navigated by steam; and steamers run along the coast, carrying the mails and produce from La Guayra to Maracaibo, and touching at the intermediate ports. Besides coffee, cocoa, sugar, indigo, and cotton, the exports annually comprise about 750,000 hides, and large quantities of live stock, tallow, horns, &c.; tobacco, salt, cotton, sarsaparilla, dye-woods, and timber. The principal imports are woven fabrics—chiefly cottons and linens—flour and provisions, hardwares, wines, and specie. The exports from Venezuela to Great Britain in 1866 were valued at 202,036*l.*, including 19,924 cwts. of cotton, value 144,407*l.* In the same year the imports of British produce and manufactures into Venezuela amounted to 410,423*l.*, and consisted chiefly of cotton manufactures, 280,812*l.*; linens, 60,923*l.*; woollens, 28,643*l.*; iron goods, 5142*l.*; and hardware, 8908*l.*

Towns.—The capital, Caracas, and most of the other principal towns of Venezuela, have been described in separate articles. [Angostura; Barcelona; Barquicimento; Caracas; Puerto Cabello; and Varinas.] *Cumana*, on the Gulf of Cariaco, has a good roadstead and export trade; but on account of the frequent earthquakes all the houses are built low, and there are no remarkable edifices. Its population was formerly about 8000, but the town was nearly destroyed by an earthquake on 15th July, 1853. *Maracaibo* is a fortified city on the western shores of the strait which connects the great lake with the Gulf of Maracaibo. It is situated in an arid and sandy tract, and contains many handsome structures, but some of the houses are of wood, and thatched. The harbour is deep, and a considerable trade is carried on with the interior—many of the inhabitants being employed in navigating the lake, and others in rearing large herds of cattle. The population is estimated at 20,000. The neighbourhood abounds with petroleum and asphalt, occasionally in a state of combustion, forming the 'Lantern of Maracaibo.' *Valencia*, the position of which is important for commerce, as all the products of the provinces of Barquicimento and Varinas pass through it to Puerto Cabello, is well built, and has 16,000 inhabitants, who carry on an active trade.

History.—The most eastern part of the coast of Venezuela, and the island of Margarita, were discovered by Christopher Columbus in his third voyage, 1498, and the following year the whole northern coast of South America, from the Gulf of Paria to Cape de la Vela, in New Granada, was explored by Ojeda and Vespucci. The first settlements on the continent were at Cumaná, which was built in 1520. In 1731 Venezuela, which up to that time had formed a part of New Granada, was separated from that country and received a captain-general. It remained under the sway of Spain till 1808, when Napoleon having deposed the royal family, and made his brother Joseph king of Spain, Venezuela, like all the American colonies of that country, declared for the ancient dynasty. Dissatisfied, however, with the measures of the regency, it proclaimed its independence in 1810. In 1812 it was brought back again to its former political condition by Spanish power. In 1813 Bolivar began his struggles for the liberation of his native country. [Bolivar.] After the Spaniards were defeated, New Granada and Quito united with Venezuela, and formed one republic under the name of Columbia. [Columbia.] This union was effected by the deputies of the three countries in 1821; but in 1830 they separated amicably, and since that time they have constituted the three republics of Venezuela, New Granada, and Ecuador. Spain formally recognized the independence of Venezuela in 1845. In 1846 a war broke out between the white and coloured population, which did not cease till 1849. The country was almost constantly disturbed by warring factions from 1848 to 1863, since which period it has been comparatively tranquil.

VENICE, REPUBLIC OF, a state politically extinct within our own times, but which figured for more than a thousand years among the independent governments of Europe, and acted a considerable part in modern history.

The continental territory of Venice in Italy was much more extensive than what is now called the province of Venetia. It included the three districts of Brescia, Bergamo, and Crema, and the peninsula of Istria. These were detached from Venice by Bonaparte in 1797, when he annexed Bergamo, Brescia, and Crema to the Cisalpine or Italian Republic, and gave the rest of the Venetian territories to Austria. In 1810, after having retaken the whole Venetian territory from Austria and united it to the kingdom of Italy, he detached Istria from it, and joined it to Dalmatia and Croatia, to form the separate government of the Illyrian Provinces. At the restoration of 1814 these administrative arrangements were maintained, and the division of the Lombardo-

Venetian Kingdom under Austria, which retained the name of Venetian States, was allowed to embrace only the old Venetian provinces; Brescia, Bergamo, and Crema remaining attached to the Lombard division. [LOMBARDO-VENETIAN KINGDOM.] Istria was made a part of the kingdom of Illyria, likewise subject to the crown of Austria.

VENICE (*Venézia*), a city in northern Italy, formerly the capital of the Republic of Venice, is situated in 45° 26′ N. lat., 12° 21′ E. long., on a number of islands in the lagoons, on the north-western extremity of the Adriatic, at a distance of 70 miles E. from Verona, and the same distance W. by S. from Trieste. The population of the city and its dependent islands in 1865 was 122,942. The lagoons are partially separated from the sea by a long spit of land called the littorale, which, however, is broken into several islands by openings, whereby ships pass up the canals to Venice. Lido, one of these islands, is connected with the continent (2 miles distant) by a stupendous bridge of twenty-two arches, forming part of the railway to Padua and Milan. The islands on which the city stands are about eighty in number, divided from each other by narrow canals, which form the highways of communication, as streets in other towns, and are spanned by 450 bridges. Narrow streets and lanes, alleys and courts, separate the buildings of each island from one another, and there are also narrow quays in some places along the canals. Carriages and horses are useless, and therefore not seen in Venice, and their place is supplied by boats called 'gondole,' which are continually plying in all parts of the town. In order to give a free passage to the gondolas, the bridges have a considerable elevation, and having been erected long before horizontal ones were known, they are very steep, rising rapidly from both extremities towards the centre. To make the ascent more easy or less dangerous, it has been formed into steps, and hence any one who attempts to thread his way on foot, has no alternative but to submit to the most fatiguing of all operations—a continued ascending and descending stairs. Most of the houses, in addition to their main entrance by water, have a land side communicating with a *calle* or lane for foot-passengers. These streets or lanes are so narrow and intricate as to render the city a vast labyrinth. Most of them are only 4 feet, and but a few as much as 6 feet in width. One of the principal thoroughfares, called the Merceria, situated near the centre of the city and lined with handsome shops, is only wide enough to allow of two carriages passing by careful driving. Venice is 2 miles distant at the nearest point from the mainland, and has a circumference of about 8 miles. There is a tide from the Adriatic, which rises a few feet over the lagoons, some of which are left nearly dry at ebb, excepting the seven large canals, which keep up the communication between the city and the ports of Malamocco and Chioggia on the Adriatic, and the landing places of Mestre, Fusina, and others, on the mainland.

Venice is defended on the land side by the water, and on the sea side by the land, the only approach to it being through narrow openings, commanded by powerful batteries crossing their fire with each other. Until these are silenced, a successful attack on the town is impossible.

The city is divided into two parts by the Canal Grande, of a serpentine character and 100 to 180 feet wide, over which there are three bridges, the Rialto, which is built of white marble, and consists only of a single arch, and two others of iron. The roadway of the Rialto is lined with shops, and the view from it is one of the finest in Venice. Another and much broader canal, or rather arm of the sea, bearing the names of Canal della Giudecca and Canal di San-Marco, divides the town from the long island and suburb of La Giudecca, and from the neighbouring island of San-Giorgio. Venice contains about 2000 streets, lanes, and alleys, and 28,000 houses, all built on piles. It has about 100 Roman Catholic churches and seven synagogues, is the see of a Roman Catholic primate, and of Greek and Armenian bishops. The inhabitants are well supplied with water, several artesian wells having been sunk in 1847 by the municipality.

The finest part of the city is the district of San-Marco, which contains the splendid duomo or cathedral of that name (built between 977 and 1043, and the finest Byzantine church in western Europe) with its lofty detached belfry; the handsome square before it, with its arcades and numerous coffee-houses—the fashionable place of resort of the Venetians; and the vast and massive ducal palace, which was the seat of the former republican government, and contains the halls of the various councils of the administration. The Sala of the Senate, or Pregadi, is still in the same state in which it was before the fall of Venice; that of the Council of Ten has been converted into a painting gallery. The vast hall in which the Great Council used to assemble, is now the repository of the library of San-Marco, which includes 120,000 volumes and 10,000 MSS. All the apartments are adorned with numerous paintings by the masters of the Venetian school, commemorating the great events and the leading characters in the history of the republic. The Sotto Piombi, or attics of the palace of the doges, formed the state prison of Venice, and on the ground floor were the pozzi, or dungeons, the horrors of which exist mainly in the imagination of poets and romance writers. The 'Bridge of Sighs' connects the ducal palace with these prisons. It was so named from the prisoners being led over it on their way to execution. The piazzetta, or lesser square of San-Marco, which is open on one side to the sea, has two handsome pillars of granite brought from Greece in the twelfth century. Upon one is the winged lion, of brass, the emblem of the republic, known by the name of the Lion of St. Mark, and upon the other stands a statue of St. Theodore, its former patron saint.

Among the many remarkable churches of Venice, besides the cathedral of San-Marco, the following deserve especial mention:—San-Giorgio Maggiore, constructed by Palladio, has the sepulchral monument of the Doge Domenico Michieli, the conqueror of Jaffa, Tyre, and Ascalon, and the 'Terror of the Greeks.' Il Redentore, also by Palladio, one of the handsomest churches in Venice, situated on the island of La Giudecca, is, like most other Venetian churches, rich in paintings. SS. Giovanni e Paolo formerly contained the famous St. Peter Martyr of Titian, but the picture was burnt in 1867. I Frari, a splendid church with numerous monuments, among others that of Canova, has several good paintings. In the suppressed convent of the Frari are deposited the archives of the old republic, which are said to fill 295 rooms. In the cathedral of San-Marco, the description of which would fill a volume, and in all the churches of Venice, there are great numbers of fine paintings, monuments, and sculptured ornaments. The city contains the tombs of the painters Titian and Paolo Veronese.

The banks of the Canale Grande are lined with splendid marble mansions of the nobility, some of which are used as offices, and many are falling to decay. The palaces Giustiniani, Pisani, Grimani, Michieli, Contarini, Ven-

dramini, and Manfrini, still possess valuable paintings and sculptures. The painting of the three portraits by Giorgione, which Byron in his 'Beppo' has so highly extolled, was formerly in the Manfrini collection, but this, as well as some of Titian's masterpieces, was sold some years ago. The Academy of the Fine Arts has been the means of saving many fine specimens of the Venetian school, which otherwise would have been lost to Venice. The gallery of the academy contains altogether about 400 paintings, besides models of the Elgin and Ægina marbles, a model of the statue of Theseus conquering the Centaur, by Canova, and a collection of original drawings of Leonardo da Vinci, Michel Angelo, and Raphael.

The arsenal or dockyard of Venice, begun in 1304, and celebrated in Dante's 'Inferno,' canto twenty-one, is situated at the eastern extremity of the city; it is surrounded by a high wall, and occupies an area of about 2 miles in circumference. When the Abbé Richard saw it (1761–62), there were about forty ships of war, of which twelve were three-deckers, in the docks ready for sea; arms for 150,000 men, 2500 pieces of brass ordnance, besides 1500 iron cannon, and vast stores of provisions, cables, sails, timber for shipbuilding, brought from the forests of Istria and Dalmatia, and all other appurtenances of such an establishment. At the present day it tells a story of departed glory, being used more as a store-house and museum than for shipbuilding and launches. There is in the arsenal a monument in relief, by Canova, to the memory of Angelo Emo, great admiral of Venice, who died in 1792, and was the last that caused the Venetian flag to be respected in the Mediterranean. At the land entrance is a gate adorned with several statues, and two marble lions, brought from Athens by Morosini in the latter part of the seventeenth century.

Venice has several theatres; that of La Fenice is one of the largest in Italy. It has also a rich cabinet of natural history belonging to the lyceum, two royal gymnasia, a patriarchal seminary for clerical students, two colleges for female education under the direction of nuns, an Athenæum of Sciences and Literature, and the Academy of the Fine Arts already mentioned. Besides the library of San-Marco, there are libraries belonging to the different colleges and academies, as well as to several convents and palaces of the nobility. The charitable institutions are numerous, but not more so than what is absolutely required by the decayed condition of the city. When the French evacuated Venice in 1814 nearly one-half of the population was in want of charitable assistance. The misery was frightful. The exertions of the Austrian government from 1814 to the insurrection of 1848 had greatly alleviated the distress of the Venetians; pecuniary assistance from the treasury, a better administration of the communal revenue, a great diminution of local taxation, the establishment of a free port, and important public works undertaken at the expense of the government, had restored to the city a considerable measure of prosperity; a railroad was completed between Venice and Verona, and the mercantile shipping of the port had assumed a new activity, and traded all over the Mediterranean. But in 1848 the citizens revolted against Austria, offering to become the subjects of Carlo Alberto, king of Sardinia; after whose defeat they formed a republic, and maintained a long siege against the Austrians, to whom the city was, however, ultimately surrendered on August 22, 1849, and from that time the Austrian government did not take so much interest in its prosperity as before.

In the middle ages Venice had a monopoly of the manufacture of glass, but this has greatly declined. The principal articles at present produced are leather, cloth, serge, canvas, cordage, cloth of gold and silver, velvet, silk hosiery, lace, pearls, counterfeit gems, mirrors, coloured glass, jewellery, waxwork, &c. The printing-presses of this city, which in early times became celebrated over Europe for the beautiful editions of the classics issued by Aldus Manutius and his successors, are still active.

Before the western nations of Europe had devoted themselves to maritime enterprise, Venice naturally became the great mart of the commerce between the East and West. The progress of discovery having opened new channels, and other causes concurring, the trade rapidly sunk until the year 1866. Its harbour is ample beyond all possible requirements, being nearly co-extensive with its lagoons; but the very deepest of the openings in the belt of land which follows them does not naturally exceed 16 feet at the highest rise; and at Malamocco, the most frequented of them, there was until recently a bar outside on which the water was never more than 10 feet. Works for deepening the entrance to Malamocco, and for deepening and widening the channel from thence to the port and arsenal of Venice, have, however, been projected and approved. The British consul, in his report for 1868, says:—'These works, by rendering the port easy of access to vessels of large tonnage, will afford important advantages to the foreign commerce, which, united with the greater facilities that are anticipated from liberal commercial treaties, and the opening (in August, 1867) of the new line of railway over the Brenner, with a moderate customs tariff, will, it is hoped, ultimately restore the foreign trade of Venice.' He adds—'The Venetians now look forward with hope to a more prosperous era, resulting from the annexation of Venice under a liberal government, favourable to free trade and moderate tariffs, with the abolition of prohibitory duties. An increase of trade may likewise be expected from the opening of the railway with Munich and southern Germany. To realize the hopes of the Venetians, however, much activity and exertion on their part will be necessary.'

In 1866 the vessels which entered and cleared numbered 5699, and measured 601,643 tons. Of these 61 (39,019 tons) were British; the chief import cargoes were coals and coke, cotton, woollen, and iron manufactures, fish, coffee and cocoa, oil, porcelain, and earthenware. The exports mainly consisted of hemp, glass, grain, and timber. The imports by sea were valued at 2,220,000*l.*, and by land and river navigation at 1,760,000*l.* The exports were—by sea, 1,250,000*l.*; by land and river navigation, 1,245,000*l.* There was a considerable decrease in the inland trade, caused, no doubt, by the recent war. Of the trade by sea, fully two-fifths of the imports and exports were from and to Austria. The value of the imports from Great Britain was about 300,000*l.*; and of the exports thereto, 520,000*l.*

The general cemetery, or burying-place for the city, is on the island of San Cristoforo di Murano. Here rich and poor, the noble and the beggar, are all interred, the expenses of the burial of the latter being defrayed by government. This cemetery was formed, and the plan of conveying all dead bodies to it from the town was enforced by the French; and it has been continued ever since. The Jews' burying-ground is at Malamocco.

Venice is one of the most beautiful as well as remarkable and interesting cities in the world; but it soon becomes tiresome to a visitor from its monotony, the

incessant recourse to boats, the narrowness of the streets, and consequent want of room, the absence of all rural beauty, and the constant sense of imprisonment. It would not be habitable except for the saltness of the water, and the ebbing and flowing of the tide; though the rise and fall of the latter, which are always less than in England, are in summer so inconsiderable that the canals become stagnant, offensive, and unhealthy. Rains are frequent, particularly in spring; the winter, though not of great length, is sharp, especially during the prevalence of the N.W. wind; while the summer is much hotter than in England, and is also accompanied by occasional visits of the *sirocco*. The mean temperature of the year is 55°·6; in winter, 38°; and in summer, 73° Fahr. Spring-time is the most suitable season for a visit to the city, when there are no stenches from the canals, or mosquitoes astir, as in the summer heats; and no bitterly cold winds from the snow-crowned Alps, which are common during the winter months.

The Venetians are no longer wholly without trees and flowers; very extensive gardens, with a fine street leading to them, having been constructed at the beginning of the present century by the French, to whose taste and munificence they are a noble monument. Though not deficient in variety or beauty, these gardens—which are nearly 2 miles in circumference, and are connected by a handsome bridge—excite more interest from the mode in which they were formed: for they were made by the introduction of earth, brought with immense labour and expense, from the continent, and no money was spared in their completion. They contain many trees and shrubs, and several serpentine walks over mounds, which form an agreeable and interesting promenade.

The square of San-Marco is the scene of all the public masquerades and festivals that take place in the city.

History.—Owing to the extensive empire acquired by this small state, whose capital, seated on low and marshy islands, surrounded by the lagoons and channels of the Adriatic, at no time contained a population exceeding that of a second rate English provincial town; owing also to its wealth, its splendour, and its commercial importance; to its triumphs by land and sea; and to the illustrious names that cast an undying glory on its annals—the history of Venice has always possessed a peculiar interest for the student.

It is impossible, however, to trace back its annals with any degree of certainty to a period long anterior to the Roman conquest. A people called the Veneti are said to have inhabited its site when it was made a kingdom by the Gauls, B.C. 356. At that time its boundaries would appear to have been denoted on the north by the Piave, and on the south by the Adige. It was conquered for the Romans by Marcellus, in 221 B.C., and divided into two provinces: *Venetia prima*, or Continental Venice, and *Venetia secunda*, including the Rialto and its sixty neighbouring islets. Governed by a Roman prætor, the Venetians nevertheless enjoyed considerable political advantages, and sheltered by the world-wide power of the Eternal City throve rapidly as a commercial and maritime people. Thus prosperous was their career until the decay of the Roman empire threw open their fertile fields and opulent towns to the desolating inroads of the northern hordes, who swept them of all their accumulated wealth, and of all their memorials of art, genius, and magnificence. Continental Venice, ravaged by successive bodies of barbarians, may almost be said to have ceased to exist, except as a charred and blackened waste, where wild beasts prowled unchecked.

The few inhabitants that escaped the swords of Hun and Goth fled for refuge to the lonely islands grouped around Rialto, which soon became the centre of an immigrant population, dependent upon the mother city of Padua, and controlled by twelve Paduan officers, under the title of tribunes (457).

Protected from maritime descents by the shallowness of the lagoons, and defended from invasion from the mainland by a breadth of mud and ooze, this new Venezia or Venice slowly increased in population, and attained to a very moderate degree of prosperity. Cassiodorus, a contemporary writer, compares its inhabitants to water-fowl, who had fixed their nests on the bosom of the waves. Fish, he says, was the common, and almost the universal food of every rank; their sole wealth was the salt which they extracted from the sea. But a people, says Gibbon, whose habitations might be doubtfully assigned to the earth or water, soon became alike familiar with the two elements, and the demands of avarice succeeded to those of necessity. The islanders, who, from Grado to Chiozza, were intimately connected with each other, penetrated into the heart of Italy by the secure, though laborious navigation of the rivers and inland canals. Their vessels, which were continually increasing in size and number, visited all the harbours of the gulf; and the marriage which Venice annually celebrated with the Adriatic, was contracted in her early infancy.

The strength and importance of the young state were increased in 568 by a numerous emigration of Paduans, who fled from their city when it was stormed and plundered by the Lombards. A long period of peaceful prosperity followed, only disturbed by the factious quarrels of the rival tribunes, whose offices having been finally abolished in 697, the entire administration of affairs, civil, military, and ecclesiastical, was vested in one person, named Duke, or Doge. The first sovereign elected to this supreme power was Anafesto Paulullo, or Paoluccio, who retained his crown of gold and sceptre of ivory until his death in 717. Arso, the third doge, whose military genius extended the renown of the republic by several victories against the Lombards, sought to render his office hereditary in his family, but the design provoked an insurrection; he was assaulted in his palace and slain. The Venetian government was then remodelled, and a chief magistrate elected annually, with the title of 'master of the militia.' But this experiment only endured for five years, and the title of doge was revived in 740, in the person of the son of him who had been assassinated.

The earliest maritime relations of Venice were with the East, and the daring and skill of her seamen speedily enabled her to monopolize almost all its commerce. She concluded, in 809, an intimate alliance with the Byzantine emperor against the French, and the latter, under King Pepin, having invaded the Venetian territory, got embarrassed among its shallow lagoons and marshy flats, to their almost entire destruction. The seat of government was then formally transferred to the Rialto, which was connected by bridges with the neighbouring islands, and the united cluster received that historic name of Venice which was so long a word of terror and a symbol of power (811). In 829 the body of Saint Mark was surreptitiously removed from Alexandria to Venice, to the great benefit of the latter city, thousands of wealthy pilgrims being attracted thither by its possession of a relic of such unquestionable sanctity. Thenceforth the Venetians adopted St. Mark as their patron saint, and his lion as their national emblem.

Their wealth rapidly increased, and their ambition kept pace with their augmenting power, which was now extended over a considerable territory on the mainland, and along the sea-boards of Dalmatia and Istria (998). In 1085 they obtained from the Byzantine court the cession of the whole provinces of Dalmatia and Croatia, while so extensive was their commerce, and so vast their maritime influence, that in 1099 they were able to equip a fleet of 207 sail for the succour of the unfortunate heroes of the first Crusade.

'The sea,' says Gibbon, in his usual stately phrase, 'was their patrimony; the western parts of the Mediterranean, from Tuscany to Gibraltar, were indeed abandoned to their rivals of Pisa and Genoa; but the Venetians acquired an early and lucrative share of the commerce of Greece and Egypt. Their riches increased with the increasing demand of Europe; their manufactures of silk and glass are of high antiquity; and they enjoyed the fruits of their industry in the magnificence of public and private life. To assert her flag, to avenge her injuries, to protect the freedom of navigation, the republic could launch and man a fleet of a hundred galleys; and the Greeks, the Saracens, and the Normans were encountered by her naval arms. The Franks of Syria were assisted by the Venetians in the reduction of the sea-coast; but their zeal was neither blind nor disinterested; and in the conquest of Tyre they shared the sovereignty of a city, the first seat of the commerce of the world. The policy of Venice,' continues the great historian, 'was marked by the avarice of a trading, and the insolence of a maritime power; yet her ambition was prudent; nor did she often forget that, if armed galleys were the effect and safeguard, merchant vessels were the cause and supply of her greatness.' In her religion she avoided the schism of the Greeks, without yielding a servile obedience to the Roman pontiff; and a free intercourse with the infidels of every clime appears to have allayed betimes the fever of superstition. Her primitive government was a strange mixture of democracy and monarchy: the doge was elected by the votes of the general assembly; as long as he was popular and successful, he reigned with the pomp and authority of a prince, but in the frequent revolutions of the State, he was deposed, or banished, or slain, by the justice or injustice of the multitude.

In 1106 the city was ravaged by a terrible conflagration, which reduced numerous churches, and public and private buildings, to ashes; out of which, to use an old simile, Venice rose like a phœnix, and began that course of architectural splendour which makes her, in her decay, so favourite a shrine of artistic pilgrimage. We may conveniently pause here in our rapid historical survey, to indicate the general character of her palatial magnificence. A recent and accurate writer, Mr. Howells, has justly observed that one can conceive of no state of things more flattering to human pride than that which surrounded the patrician of the old aristocratic republic. The house in which he dwelt was the palace of a king in luxury of appointment and magnificent proportions. 'Troops of servants that ministered to his state peopled its vast extent, and the gondolas that carried his splendour abroad were moored in little fleets to the piles that rose before his palace, painted with the family arms and colours. The palace itself stood usually on the Grand Canal, and rose sheer from the water, giving the noble that haughty inaccessibility which the lord of the mainland achieved only by building lofty walls and multiplying gates. The architecture was as costly in its ornament as wild Gothic fancy, or Renaissance luxury, of bad taste could make it, and when the palace front was not of carven marble, the painter's pencil filled it with the delight of colour. The mainland noble's house was half a fortress, and formed his stronghold in times of popular tumult or family fray; but at Venice the strong arm of St. Mark suppressed all turbulence in a city secure from foreign war; and the peaceful arts rejoiced in undisturbed possession of the palaces, which rose in the most delicate and fantastic beauty, and mirrored in the brine a dream of sea-deep strangeness and richness. You see all the strangeness and beauty yet, but the pride and opulence which called it into being are gone for ever.'

If the private life of the Venetian noble was distinguished by its superb state, in his political character he had yet greater grandeur. 'He was part of the proudest, strongest, and securest system of his time. He was a king with the fellowship of kings, flattered with the equality of an aristocracy which was master of itself and of its nominal head. During the earlier times it was his office to go daily to Rialto and instruct the people in their political rights and duties for four hours; and even when these duties became everything and the rights nothing, the friendly habit of daily intercourse between patricians and citizens was still kept up at the same place. Twice a week, on Thursdays and Saturdays, the noble took his seat in the Grand Council, or the Ten, or the Three, according to his office in the state, holding his place in the senate by right of birth, and in the other bodies by election of his peers.'

The special greatness of Venice may be dated from the capture of Constantinople by the Latins in 1204. It is true that in this memorable enterprise, which diverted a mighty armament intended for the recovery of Jerusalem from the Saracen, the French were engaged as well as the Venetians; but the former only as private adventurers, the latter with the whole strength of the republic under its famous doge, Enrico Dandolo. Three-eighths of the Byzantine city, and an equal proportion of the provinces, were allotted to them as their share of the spoil, and the doge adopted the singular but accurate title, 'Duke of three-eighths of the Roman empire.' Their share was augmented by purchases from the less wealthy crusaders, especially one of much importance, the island of Candia, which they retained till the middle of the seventeenth century. Generally these foreign acquisitions were granted out in fief to the Venetian nobles, under the supremacy of the republic. It was in this wise that the Ionian Islands came under her dominion, and insured to her that sovereignty over the Adriatic which she now began to claim. Those of the Archipelago she lost in the sixteenth century.

All this political magnificence was sustained and developed by an ever-increasing commerce. No Christian state preserved so considerable an intercourse with the Mohammedans. While Genoa held the keys of the Black Sea by her colonies of Pera and Kaffa, Venice directed her vessels to Acre and Alexandria. These connections, remarks Hallam, as is the natural effect of trade, deadened the sense of religious antipathy; and the Venetians were sometimes charged with obstructing all efforts towards a new crusade against, or even any partial attacks upon, the Mohammedan nations.

The commercial rivalry which had so long existed between the Genoese and Venice passed, in the thirteenth century, into a desperate struggle for the sovereignty of the seas. In the opening contest the Venetians were successful, and the Genoese fleet suffered a severe defeat near Negropont. An interval of peace was followed by renewed hostilities, in which fortune singularly favoured

the Genoese, who almost annihilated the armada of their rivals in the desperate battle of Corzuola, only twelve galleys out of ninety-six effecting their escape. Exhausted and humiliated, the Venetians purchased peace on hard conditions in 1299. Hostilities, however, soon broke out afresh, and, with occasional pauses, continued for upwards of a century. The severest period of this deadly strife was from 1350 to 1381. The Venetians were defeated by Paganino Doria in the channel of the Bosporus, February 13, 1352. They, in some measure, retrieved their reputation by a victory off the Sardinian coast, August 29, 1353; but were again defeated, and their fleet almost destroyed, in the Gulf of Sapienza, November 3, 1354. In the following May they made peace, but in 1378 the old fires again flamed forth, and they took advantage of a quarrel between the Genoese and Cypriotes to attack the fleet of the former off Antium. Their success was dearly purchased, for the Genoese equipped a formidable armada, which they placed under the command of Pietro Doria; and encountering the Venetian squadrons while ill armed and weakly manned, gained so complete a victory that only seven galleys escaped to bear the sad tidings of disaster to Venice. In their wake followed the triumphant Genoese, who resolved to reduce the city, and blot her name from the list of independent nations. Doria forced the passage of the lagoon, and stormed the little town of Chioggia, built upon the inside of the isle bearing that name, about 25 miles S. of Venice. In this extremity the republic of St. Mark displayed a courage and a resolution worthy of its ancient renown. It intrusted its defence to its greatest seaman, the admiral Victor Pisani; and under his vigorous direction the canals were fortified or occupied by large vessels armed with artillery; thirty-four galleys were equipped; every citizen contributed his quota to the national fund; in the entire absence of commercial resources (for Venice did not possess a single merchant ship during this war) private plate was melted; and the Senate promised patents of nobility to the thirty families who should be most forward in the noble strife of patriotism.

In recapitulating the principal events of this great struggle we shall adopt the excellent summary of Mr. Hallam.

The new fleet, he says, was so ill provided with seamen that for some months the admiral employed them only in manœuvring along the canals. From some unaccountable supineness, or more probably from the insuperable difficulties of the undertaking, the Genoese made no assault upon the city. They had, indeed, fair grounds to hope its reduction by famine or despair. Every access to the Continent was cut off by the troops of Padua, then in alliance with Genoa; while another enemy, the king of Hungary, had captured almost all the Venetian towns in Istria and along the Dalmatian coast. The doge Contarini, assuming the chief command, arrived at length with his fleet off Chioggia, to the complete surprise of the Genoese. Pushing one of the large round vessels, then called *cocche*, into the narrow passage of Chioggia which connects the lagoon with the sea, and mooring her athwart the channel, he interrupted that communication. Attacked with fury by the enemy, this vessel foundered, and the doge improved his advantage by sinking loads of stone until the channel became absolutely impracticable. It would still have been possible for the Genoese fleet to have followed the principal canal of the lagoon towards Venice, or to have sailed out of it by the harbour of Biondolo; but, whether from confusion or from miscalculating the perils of their position, they

suffered the Venetians to close also this canal upon them by the same means they had adopted at Chioggia, and even to station their fleet in the entrance of Biondolo in such immediate proximity to the lagoon that the Genoese could not array their ships in line of battle.

Thus, the conditions of the combat and the circumstances of the combatants were entirely reversed. The Genoese fleet was now blocked up in Chioggia, not the Venetians in the Venetian waters. But then the Genoese held an impregnable position, and their command of the land secured them from famine. Notwithstanding her unexpected success, the City of the Isles was very far from safety; it was difficult for the doge to keep the seas during the storms of winter; and if the enemy should attempt to force a passage, the risks of combat were extremely hazardous. It is said that the senate deliberated upon removing the seat of St. Mark to Candia, and that the doge had announced his intention of raising the siege of Chioggia, if certain expected succours did not arrive by the 1st of January, 1380. On that very day Carlo Zeno, an admiral who, ignorant of his country's danger, had been supporting her renown in the Levant, arrived with a squadron of eighteen galleys. The reinforcement revived the hopes and confidence of Venice. Superior in strength to the enemy, her fleet began to press them closely, and after an obstinate resistance the Genoese surrendered. The pride of Genoa was deemed to be justly humbled by this reverse of fortune; and even one of her own historians confesses that God would not suffer so noble a city as Venice to become the spoil of a conqueror.

In the following year peace was concluded between the two rivals, and Venice surrendered most of her territorial possessions to the king of Hungary, and the island of Tenedos to Genoa. But from this time the power of the latter began to decline; her fleets no longer swept the seas, and her commerce gradually sank into decay. Venice, on the contrary, recovered almost all her losses, and the fifteenth century was the era of her utmost magnificence.

She was not exempt, however, from internal troubles. Of these, the most remarkable was the conspiracy of Marino Faliero, in 1355, which has been immortalized in one of Byron's noblest tragedies, by Casimir de la Vigne in one of his finest romances, and whose story has been graphically told by Sismondi. Its object was to overthrow the power of the nobility, and especially of that mysterious junta, the Council of Ten, with the ultimate view of establishing an absolute monarchy. But the doge was betrayed, summoned before the council, hastily tried, condemned, and beheaded.

Early in the fifteenth century Venice engaged in hostilities with Novello, lord of Padua. The war was sharp but brief; and at its conclusion the republic found her sway extended over the richest portion of the Lombard plain, including the cities of Belluno, Veltre, Padua, Verona, and Vicenza. In 1425 she embarked in the great Italian war, which gradually drew within its vortex not only all the Italian states, but France, Spain, and Austria, and drained the lifeblood of the land for barren results. The arms of the republic were, on the whole, successful, and she acquired a considerable extension of territory; but the prolonged struggle robbed her of her male population and her accumulated treasures, while the energies of her people were diverted from those commercial enterprises which had formerly made her rich and strong. She lost many of her fairest Eastern possessions in her war against the Turks, 1461–77; and though she conquered Athens and Cyprus, these gains

were more than counterbalanced by that great discovery of Columbus (1492), which threw open to the Western nations the treasures of a new world; and by that inauguration of the ocean route to the Indies (1497), which destroyed her monopoly of the commerce of the East. At the same time her arrogance and cupidity aroused against her a coalition of formidable enemies: the emperor, the pope, and the French king uniting in the memorable League of Cambray (1508), which brought her to the very brink of ruin, and though she retained her independence, deprived her of all her possessions in the Milanese and the States of the Church.

Throughout the sixteenth century Venice was at war, exhausting her already declining resources in vain attempts to regain her lost maritime supremacy. Her rulers, however, still indulged their passion for display by adorning the city with many sumptuous structures; in 1592 the beautiful Piazza di San Marco was erected, and the famous bridge of the Rialto. Long before this period the doge had become the puppet of a pageant; and, deprived of all real power, moved, lived, spoke as inspired by the mysterious Council of Ten, or rather by the three members of that council in whose hands the entire resources of the state were virtually deposited by their colleagues. The citizens and nobles of Venice groaned under a peculiarly oppressive tyranny. The spies of the government seemed ubiquitous and invisible, to such perfection was the Venetian system of espionage carried; and no man, however influential or beloved, was safe from the secret denunciation, which brought upon the victim's head spoliation, captivity, banishment, or even death. Such a policy had its natural result in a general demoralization of the people; and during the last period of her independent existence Venice became a luxurious Capua, to which strangers resorted for the sake of the license she offered in the indulgence of the worst passions. In the middle of the seventeenth century she displayed some signs of the spirit that had formerly made her great, and her fleets inflicted two severe defeats upon her ancient enemies, the Turks, at Scio, in 1651, and in the Dardanelles, in 1655. But these were more than counterbalanced by her loss of Candia in 1669. In the last year of the century she recovered a portion of the Morea, but was again dispossessed by her Moslem foes in 1739, and from that date her decline was signally rapid. Her quays were deserted, her commerce became nearly extinct, and her reduced revenues barely sufficed to maintain the empty splendour of her government. In a word, the fruit was ripe for plucking; and when in 1797 the city was occupied by Napoleon Bonaparte, her rulers and her citizens were equally incapable of one heroic struggle for independence. It might almost be said that she died, and 'made no sign.'

By the Treaty of Campo Formio, October 17, 1797, a part of the Venetian territory was annexed to Austria; the remainder was incorporated in the so-called Cisalpine Republic, created by the great French commander. This arrangement only endured until 1806, when Austria, humbled at Austerlitz and Wagram, resigned her portion of Venice to the new kingdom of Italy, whose crown Napoleon placed upon his own head, administering it through the agency of a viceroy, Prince Eugene Beauharnais. By the Treaty of Vienna, in 1815, Austria obtained the whole of Venetia, which, along with Lombardy, formed the Lombardo-Venetian kingdom, one of the Austrian crownlands. In 1830 Venice was declared a free port; a measure which, to some extent, revived her commercial prosperity. Under the stern Austrian rule, however, she appeared to lose all the life and light that had once rendered her so attractive; and to the visitors attracted thither by her past renown and her monuments of art, she seemed a city of the dead. Her citizens remembered their ancient glories, and sighed for a freedom which, sooth to say, they had made no great sacrifices to preserve. The Austrian government would fain have governed fairly, but were defied by a stern and unyielding attitude of obstinacy, which forced them into repressive measures. No longer enervated by luxury, the Venetian recovered his former admirable qualities, and in the hope of eventual deliverance submitted to the greatest sacrifices, eschewing everything which makes life easy and joyous, because he must have shared his pleasures with the rulers he hated. Thus, during the continuance of the Austrian sway, the gondolas were deserted, and the theatres empty, and over the vast palaces hung an air of gloom and desolation.

The year 1848 was a year of revolutions, and perceiving the perils of Austria in the discontent of various portions of her ill-jointed empire, the Venetians availed themselves of the time to make a bold stroke for freedom. They rose against the oppressors, and expelled them from the city (March 22). But no help came from without. The Austrians poured a large army into the Venetian territory, and besieged Venice, which, after a gallant resistance, was constrained to surrender, August 22, 1849. From this time the government of Austria became really severe, and the hatred with which it was regarded by the Venetians increased in intensity year by year, amounting to a sublime madness after the failure of their hopes of deliverance in 1859, when they beheld Lombardy freed by the peace of Villafranca, while their own shackles remained undone. The condition of things which existed from 1859 to 1866 is thus described by an acute and trustworthy observer:—

'The stranger in Venice,' he says, 'finds himself planted between two hostile camps, with merely the choice of sides open to him. Neutrality is solitude in Venice, and friendship with neither party; society is exclusive association with the Austrians or with the Italians. The latter do not spare one of their own number if he consorts with their masters, and though an alien might expect greater allowance, it is never shown to him. There are all degrees of fineness in Venetian hatred, and after hearing certain persons pour out the gall of bitterness upon the Austrians, you may chance to hear these persons spoken of as tepid in their patriotism by yet more fiery haters. To be seen in the company of officers is enmity to Venetian freedom, and in the case of Italians it is treason to country and race. Of course, in a city where there is a large garrison, and a great many officers who have nothing else to do, there is inevitably some international love-making, although the Austrian officers are rigidly excluded from association with the citizens. But the Italian who marries an Austrian severs the dearest ties that bound her to life, and remains an exile in the heart of her country. Yet it must not be supposed that the Italians hate the Austrians as individuals. They are simply hated as the means by which an alien and despotic government is imposed upon a people believing themselves born for freedom and independence.'

The retention of Venice under such circumstances was a political blunder on the part of Austria, who was compelled to maintain a large army, and lay herself open to attack at a point where she was least capable of defence. Had she declared Venice free, and given it up to the Italians, she would have secured their gratitude

and their assistance in the hour of need. But nations are governed by the same feelings as individuals, and a sentiment of pride induced the Austrian government to retain what they felt to be a burden and a danger. Accordingly, in 1866, when war broke out between Prussia and Austria, Italy eagerly accepted the Prussian alliance, and moved against Venetia. It is true that the Italian army was defeated at Custozza, and the Italian fleet at Lissa; but Austria was compelled to maintain a twofold struggle at a time when she needed every man and every gun for the defence of her German provinces. The result was her total defeat, and almost annihilation on the field of Sadowa, followed by the Treaty of Prague (October, 1866), which gave up Venice to the new Italian kingdom. In November, 1866, King Victor Emmanuel entered the 'City of the Adriatic' in state, and was enthusiastically welcomed by its inhabitants.

Venice, we may add, was ruled by 122 doges in all; from Anafesto, in 697, to Luigi Manin, in 1797. In both art and literature she can boast of immortal names. The Venetian school of painting, famous for the brilliancy of its colouring, may be said to have been founded by Antonello da Messina (1447–96), but its greatest masters were TITIAN (1477–1576), Jacopo Robusti, or TINTORETTO (1512–94), and CAGLIARI, better known as Paolo Veronese (1528–88). [VENETIAN SCHOOL OF PAINTING.] The beauties of Venetian architecture, a phase of the Renaissance style, distinguished by its gorgeous ornamentation, are familiar to every man of taste. Venice has had the singular fortune to inspire the genius of many foreign writers, and in English literature she is indissolubly associated with the memory of Shakspeare, Otway, Byron, Rogers, and Fenimore Cooper; while her splendid palaces, churches, and monuments could never have found among her own sons an abler or a more enthusiastic commentator than Ruskin.

(Daru, *Histoire de Venise*; Sismondi, *Histoire des Républiques Italiennes*; W. Carew Hazlitt, *History of the Republic of Venice*; J. Ruskin, *The Stones of Venice*; W. D. Howells, *Venetian Life*; Hallam, *History of the Middle Ages*; Thomas Dyer, *History of Modern Europe*, &c.)

VENI'RE FA'CIAS, or *Venire*, the name of a writ addressed to the sheriff or other returning officer, commanding him 'to cause to come' (*venire facias*) the parties set forth at the place named in the writ. The purpose to which the writ was generally applied, and in reference to which it was generally known, was in summoning juries to serve for the ordinary trial of civil causes.

This writ was sued out, but was not acted upon, for the court assumed that the jurors had been summoned upon it and had failed to appear at Westminster, where anciently the trial itself took place. At the same time another writ issued, by which the sheriff was commanded to distrain their lands or goods, or have their bodies, so as to compel their appearance either before the court at a subsequent day, or before the judges of assize or Nisi Prius, if they should previously come into the county. This was so arranged that the judges always did previously come into the county, and the jury were summoned and caused to appear before them. The writ and the whole process were abolished by the Common Law Procedure Act, 1852.

This writ is unknown in Scotland. *Summons* is the general term for warrants to call persons into court, either as parties, jurors, or witnesses.

VENLOO. [LIMBURG, *Dutch.*]

VENT, in Artillery, the hollow channel through which the flame is communicated to the charge of gunpowder. In the British vents are two-ninths of an inch in diameter.

VENTILA'GO, a genus consisting of a species of plants, of the natural order of It forms a large climbing shrub with stiff b is often dioecious, and its flowers have an off

VENTILATION. [WARMING AND VEN

VENTNOR, the principal town and wa or 'health-resort,' on the south shore of Wight, 12 miles from Ryde, with which it nected by the Isle of Wight Railway. C warm and equable temperature, and its situ some of the most romantic scenery of the fa cliff, it has become a favourite residence w Its salubrious climate was first pointed out b Clark, late physician to the queen. It consis clusters of handsome villas and lodging-h some good shops, commodious hotels, a esplanade, a literary institute, and two chur which possess more than ordinary architectura In the neighbourhood is Steephill Castle, t seat of Mrs. Hambrough. A project is now establishing at Ventnor a consumption hosp Bonchurch, St. Lawrence, Blackgang, Bon and Shanklin Chine, are all within easy dist growth of Ventnor has been extraordinary consisted of half a dozen fishermen's huts; it is ing town with a population of 4500. [WIGH

VENTRE INSPICIENDO, WRIT DE widow is suspected to feign herself with ch to produce a supposititious heir to the est presumptive may have a writ de ventre in examine whether she be with child or not; be, to keep her under proper restraint til which is entirely conformable to the practic law: but if the widow be, upon due examin not to be pregnant, the presumptive he admitted to the inheritance, though he ha again, on the birth of a child within forty the death of a husband. (Blackstone, 'Com The Roman practice is explained in the Digest (25 tit. 4), 'De inspiciendo ventr doque partu.'

The form of the English writ 'De Ventre is given Co. Litt., 8 b. It is directed to the commands him to empanel a jury of twelv search whether the widow be enceinte. that she is with child, another writ issues mands that she shall be safely kept and do by the women, who must be present at the

This writ is unknown in Scotland, but the is there attained by procedure at common l

VENTRICLE. [HEART.]

VENTRILOQUISM (literally 'belly-spe *venter*, 'the belly,' and *loquor*, 'I speak' mimicry of sounds, by which an illusion is the hearer, who supposes that the sound from the mimic, but from some other place

The form and size of the vocal tube can various ways—as by dilating or contracting t by dilating or contracting the mouth; by co communication between the pharynx and by altering the form of the mouth's cavit these modifications of the vocal tube con liarity of quality to the voice. All these laryngeal sounds. Sounds can be produced

rt from the larynx. These are not vocal sounds. them, however, may be of a definite and uniform hile others are mere noises, as gurgling, whistling, and many others.

ng from the imitation of sounds, as that of knife-, sawing and planing wood, the voices of ani-c., we proceed to explain those illusions where so perfectly counterfeits the reality intended, appears not to issue from the mimic, but from source.

ssence of ventriloquism consists in creating illu- to the distance and direction whence a sound elled; which are thus explained:—

istance. We do not hear the distance which a as travelled from its source, but we judge the from our former experience, by comparing the which we hear with the known distance and loudness of similar sounds heard on former occa- Near sounds are louder than distant ones. Now rving the same pitch, quality, and duration, but accurately graduated reduction of loudness, a ming a perspective (if the term be allowable) ds may be created, which, falling in succession ear, will suggest to the mind a constantly g distance of the sound's source. In this way l ventriloquist will produce an imitation of a watchman crying the hour, so perfect as to reality. An effort of a similar character, but the source of sound is approaching, is produced theatre in the representation of Macbeth. A band is faintly heard, which gradually increases ess, suggesting to the mind the approach from distance of the victorious army of Macbeth, ordinary degree of loudness suggests its proxi- en the army immediately comes upon the stage. nate then which is formed of the distance which has travelled before reaching the ear is a judg- the mind, formed by comparing a present per- by hearing) with the remembrance of a former in connection with its known distance.

rection. The direction whence a sound comes be judged of by the right or left ear receiving ger impression, which, however, can only take en the sound's source is in a plane, or nearly so, ne passing through both ears. It is familiarly hat a person in a house cannot, by the noise of aching carriage, judge with certainty whether ning from the right or left. He accurately to be approaching, passing, or receding, as the y be, by the gradations of loudness, but is decide with certainty whether its approach or is from up or down the street. Common e shows the judgment to be more fallible con- he direction than the distance of sounds.

s been remarked that ventriloquists indicate rectly or indirectly the direction in which they audience to believe the sound is coming. ey directly indicate it by words, such as— u up there?' 'He is up the chimney.' 'He cellar.' 'Are you down there?' &c. And irectly indicate it by some suggestive circum- as an action or gesture which is so skilfully ive and natural as to effect its object without scovered. Thus, when the ventriloquist looks s in any direction, or even simply turns towards it, as if he expected sound to come thence, the of an audience is by that means instantly also to the same place, and before a sound is , the audience expects it to come in the suggested direction. The ventriloquist has merely by his adjustment of vocal loudness to indicate the necessary distance, when a misjudgment of the audience will complete the illusion which he has begun.

The ventriloquist imitates the sound, not as it is heard at its source, but as after travelling from a distance. A skilful ventriloquist can effect his imitations without much movement of his lips and features. It has been observed, that ventriloquists during their efforts turn the front face away from the audience and scarcely even show the profile. This observation, as far as regards moderate-sized rooms, is generally true, but the front face is occasionally shown in a theatre.

It is quite easy to speak without moving the jaw, and it is the jaw's movements which disturb the features in utterance. Now the labial sounds, as B, P, M, when the jaw is thus fixed, can be made with a slight movement of the lips. The lips and jaws being always somewhat open during ventriloquy, a slight labial movement remains unnoticed, unless special attention be directed to it; and all the modifications of voice can be produced without at all distorting the features or moving the lips.

VENUE (*vicinetum*, *visne*, 'neighbourhood'). The county in which the trial of a cause takes place is said to be the Venue of that cause. The old practice in this matter is connected with the original functions of the jury, as persons who were acquainted with the facts in issue. [JURY.] In order then that a proper Venire might issue to the sheriff, the place in which the action was brought was stated in the margin of the declaration, and on the statement throughout the pleadings of any issuable fact a statement was also made of the place at which such fact was alleged to have occurred. As to all such facts upon which issue was taken, a venire was sued out applying to each different place. The sheriff returned jurors from that place, and by those jurors the facts were decided, so that several distinct venires and trials might be necessary to dispose of the issues in one action.

When juries began to determine on the evidence of witnesses, this practice declined, till at last, the form of the Venire still continuing the same, two jurors from the same hundred only were required for the trial of a personal action. By the stat. 16 & 17 Car. II. c. 8, it was enacted that no error should be brought, because there was no right venue, provided the cause was tried by a jury of the proper county or place where the action was brought. After this statute the practice was established of trying all the issues by the jury of the general venue in the action. By 4 Anne, c. 16, it was further enacted that 'that every Venire Facias for the trial of any issue shall be awarded of the body of the proper county where such issue is triable;' that is, from the county at large, and such is still the practice. By a general rule of all the courts, of Hilary Term, 4 Will. IV., it is ordered, that 'in future the name of a county shall in all cases be stated in the margin of a declaration, and shall be taken to be the venue intended by the plaintiff, and no venue shall be stated in the body of the declaration, or in any subsequent pleading.'

A distinction was long since established between local (that is, actions relating to real estate) and transitory (that is, actions of debt, contract, for personal injuries, &c.). In regard to the former, it was held that the place in which the subject-matter was situated must be laid as the venue in the action, and that rule still prevails. In transitory actions, the subject-matter of them being held not to have any fixed place, the plaintiff has liberty to bring his action in any county. Conse-

quently, though the cause of action has occurred even out of the kingdom, the plaintiff can bring his action in the courts of this country. The courts upon application made to them can change the venue. This is done upon its being made to appear that great inconvenience would arise from trying in the original county, because the body of the evidence lies in another, or because from local prejudices a fair trial cannot be had, &c. And the same authority is exercised even in local actions. By rule 18 of the Hilary Term rules of 1853, no venue shall be changed without a special order of the court or judge, unless by consent of the parties (Archbold's *Practice*, 11th edition, p. 1330).

In criminal trials the venue is the county in which the offence charged was actually committed; before a grand jury of that county the indictment must be preferred, and before a petty jury the trial held. The courts, however, have the same discretion as to the power of changing the venue as in civil cases; and as to criminal trials many exceptions have been introduced by various statutes.

The term *venue* is unknown in Scotland, though, under the name of *locus delicti*, similar rules are observed in criminal jurisdiction.

VENUS. [APHRODITE.]

VENUS, the name of the planet which is nearest to the earth, and, except Mercury, nearest to the sun.

The general description of its appearance in our day, as given by Sir J. Herschel, is as follows:—'Although it occasionally attains the diameter of 61″, which is larger than that of any other planet, it is yet the most difficult of them all to define with telescopes. The intense lustre of its illuminated part dazzles the sight, and exaggerates every imperfection of the telescope: yet we see clearly that its surface is not mottled over with permanent spots like the moon; we perceive in it neither mountains nor shadows, but a uniform brightness, in which sometimes we may indeed fancy obscurer portions, but can seldom or never rest fully satisfied of the fact. The most natural conclusion, from the very rare appearance and want of permanence of the spots, is, that we do not see, as in the moon, the real surface of this planet, but only its atmosphere, much loaded with clouds, and which may serve to mitigate the otherwise intense glare of its sunshine.'

Venus, like Mercury, from the orbit being entirely within that of the earth, is never at more than a certain angular distance from the sun: her greatest angular distance, or elongation, being from 45° to 47° 12′. Her mean apparent diameter is 16″·6, but varies from 9″·5 to 62″·0. The real diameter is ·975 of that of the earth, or about 7814 miles, and the volume is ·936 of that of the earth. Her mass is $\frac{1}{401911}$ of the sun. Her sidereal revolution is performed in 224·7007754 mean solar days, and her synodical period, or the interval between her successive conjunctions with the sun, is 583·920 mean solar days. Her light and heat are to that of the earth as 1·911 to 1·000. The mean distance from the sun is ·7233316, that of the earth being unity. Her true distance is found by multiplying the old and new values of the earth's distance from the sun, namely 95,274,000 and 91,678,000 miles, by this number. She is supposed to revolve about an axis, and the time of rotation is computed at 23 hours, 16 minutes, 19·3 seconds.

When Venus is to the west of the sun she rises and sets before him, and was then called Phosphorus and Lucifer by the ancients; but when she is to the east of the sun she rises and sets after him, and was then called Hesperus. The old terms of our almanacs, 'Morning-Star' and 'Evening-Star,' have reference to these positions.

VENUS. [VENERIDÆ.]

VENUS DE MEDICI is the name of one of the most celebrated relics of ancient sculpture ever transmitted to our times, and considered a perfect specimen of artistic skill and beauty. It appears to have been the production of Cleomanes, the son of Apollodorus of Athens, who lived about 200 years before Christ. It was found in the villa of Hadrian, near Tivoli, about the year 1680; but it was broken into several pieces, which had to be united together. It is now placed in the Imperial Gallery of Florence.

VENUSBERG, the name of several mountains in Suabia, in other parts of Germany, and also in Italy, appears to have been first used in a poem called 'The Children of Limburg,' written in the Low Countries about 1330 to 1340. The Lady Venus, whose palace is supposed to be situated in the interior of the Venusberg, where the elves and gnomes, imps and unbaptised children, maintain a constant succession of revels, is a classical name for the Teutonic idea of the Demeter, or Universal Mother. The court seems to be borrowed from the Homeric picture of Calypso's island, and the whole fable is a confused mixture of German and classical elements. [TANNHAUSER.]

VERA CRUZ, a seaport in Mexico, is situated in 19° 11′ N. lat., and 96° 8′ W. long., on the south-western shores of the southern part of the Gulf of Mexico. It is still one of the most important commercial towns of the republic, though it has properly speaking no harbour, but only a roadstead formed by several shoals, which inclose in a semicircular form a tract of sea. The fortress of San Juan de Ulloa is built about half-a-mile from the shore, on a rocky island, on which is also a lighthouse, showing a brilliant revolving light, 79 feet above the water. The tide ebbs and flows only once in 24 hours. The harbour is provided with a good stone mole, but it is very insecure, having neither good anchorage, nor sufficient protection from the northerly gales, called *Nortes*, which are terrible hurricanes, bearing along in their course clouds of sand from the hills behind the town. When they prevail, many vessels are wrecked on the adjoining coast. The anchorage is so very bad that no ship is considered safe unless made fast to brass rings fixed for the purpose in the castle walls.

Vera Cruz is built on a level and arid shore, consisting of sand, and almost entirely destitute of vegetation. Surrounding the town are marshes and sand-hills: the latter rise from 25 to 36 feet above their base, and are composed of sand so fine and loose that they change their form and position annually. The reflection of the solar rays from these hills is supposed to be one cause of the great heat during summer. Crowds of vultures and buzzards perform the office of scavengers; the drainage of the city flows down open channels in the centre of the streets, which are almost on a level with the sea; there is no good drinkable water to be obtained; and this added to the unhealthy marshes in the neighbourhood gives rise to many dreadful diseases. Yellow fever is prevalent from May to November in one of its most virulent forms, and is then almost certain to attack newly-arrived strangers from other countries. The town, which is surrounded by strong walls, is well built in the old Moorish style. It is in the form of a semicircle facing the sea, from which it presents a very imposing and picturesque appearance. The streets are

straight and wide; the paving is very good, and every road has a raised footway on each side, of a convenient breadth, and frequently under arcades. Many of the houses are excellent, and all are constructed of a porous white coral limestone, which composes the cliffs on the coast, and is usually found in large rounded masses. Besides the cathedral, there are fifteen churches, only six of which, however, are now in use; though the cupolas of all still remain, and may be counted from the sea, as they form very conspicuous objects. The other principal structures are—the government house, which is tolerably handsome, some splendid hotels and palaces; a few good hospitals; and several dilapidated monasteries, which, like most of its religious edifices, have been neglected or abandoned since the Spaniards were expelled from the town. Speaking generally, the public buildings are not remarkable for their beauty; but there are several fine squares. Rain-water is collected in tanks on the roofs of the houses; but the common people use the water brought by an aqueduct from the Laguna, a lake about 6 miles distant from the town.

Before 1820 Vera Cruz was the only port on the eastern coast of Mexico from which the produce of the country was exported, and by which foreign goods destined for the consumption of the interior reached their destination. At that period the value of the articles exported amounted to 21,780,000 dollars, and those imported to 14,650,000 dollars. But soon after 1820 the other ports of the country were thrown open to the foreign trade, and since that time many of its former exports, especially the produce of the northern mines, have found their way to other ports, particularly to Tampico, which is in a healthier situation, and has a better harbour. [MEXICO.] But notwithstanding its numerous disadvantages, the commerce of Vera Cruz is still considerable—the value of the exports and imports in a recent year being nearly 4,000,000*l.* The principal articles exported are bullion, cochineal, sugar, flour, indigo, drugs, vanilla, logwood, sarsaparilla, jalap, soap, and pimento: the imports are chiefly linen, cotton, woollen, and silk goods, paper, wine, brandy, cocoa, quicksilver, iron, cutlery, wax, earthenware, &c.

A line of railway has recently been constructed from Vera Cruz into the interior of the country; and a tramway 2½ miles in length has been laid down from the station to the principal streets of the town.

Vera Cruz is situated about 185 miles E. from Mexico; and contained in 1864 a population estimated at 10,500, including numerous foreigners from all parts of the civilized world. Formerly it had not less than 20,000 inhabitants. The full name of the city is *Villa Rica de la Vera Cruz* ('the rich city of the true cross'). It was founded in the latter part of the sixteenth century on the spot where Cortez first landed in 1519. Its castle, which completely commands it, was taken by the French in 1829; and by the Americans, after bombarding the town, in 1847. It was again captured by a French force on the 8th December, 1861, and became the basis of the war operations which led to the establishment of the short-lived Mexican empire. The late Emperor Maximilian landed here on the 29th May, 1864, and his remains were conveyed hence to Austria in 1868.

VERATRIA, a vegetable alkali prepared from cevadilla, the seed of the *Helonias officinalis*. It is a white or greenish-white powder, which has a silky and crystalline appearance under the microscope; it is inodorous, very acrid, and poisonous. It is insoluble in water and alkaline solutions; very soluble in alcohol, and sparingly in ether. The solution when evaporated deposits transparent laminæ. The salts of Veratria are neutral, and have a slight styptic taste. Veratria consists of $C_{64}\ H_{52}\ N_2\ O_{16}$.

VERATRIC ACID, the acid with which Veratria exists combined in cevadilla. It consists of $C_{18}\ H_{10}\ O_8$. It crystallizes in short prisms, which are transparent and colourless, and slightly sour to the taste. It melts at a high temperature into a colourless liquid, and sublimates without leaving any residue. Veratric acid forms crystallizable salts with the alkalies, which are very soluble in water and alcohol.

VERATRUM, a genus of plants belonging to the natural order *Melanthaceæ*.

V. album, common White Hellebore, is a native of moist alpine meadows in the southern, central, and northern parts of Europe, but not of Britain. In company with the *Gentiana lutea* it is one of the most prominent features in the rich pastures of the Alps of Switzerland and Savoy. *V. viride*, Green-flowered Veratrum, is a North American species, and flourishes in swamps and bogs from Canada to the Carolinas. *V. nigrum*, Dark-flowered Veratrum, is a native of dry mountainous situations in Siberia, Hungary, Austria, and Greece. It will grow freely in gardens in Britain, especially in a light soil. *V. Virginicum*, Virginian Veratrum, thrives amongst luxuriant herbage in low grounds from New York to the Carolinas. It is a hardy plant, and may be grown in gardens in Britain.

VERATRUM ALBUM (White Hellebore), *Medical Properties of*. Of this, two varieties (if not distinct species) are officinal: one termed *V. album*, the other *V. lobellianum*. This last prefers a chalky soil; the plants occur in the meadows of the Swiss Alps, the Pyrenees, the mountains of Austria, and in Siberia. The rhizoma of both kinds is collected indiscriminately. It is nearly devoid of odour, but has an acrid, bitter, burning taste. It is easily powdered, but the person engaged in powdering it should wear a mask, as it excites a heat, an eruption of the skin, and any drawn up the nostrils causes violent sneezing and inflammation of the lining membrane of the nose. In doses short of any dangerous or violent effect, white hellebore exercises a peculiar action on the secreting organs, the stomach and intestines, and the nervous system. Almost all mucous surfaces, and the glands connected with them, as well as the kidneys, are excited to increased secretion.

The medicinal employment of white hellebore is not very great in the present day; but when administered with due caution it is of great service in gouty and dyspeptic disorders, where there is torpor of the liver, sluggish bowels, and defective secretion from the kidneys. From its influence on these organs it often proves useful in chronic cutaneous diseases, in which the digestion is always impaired. It is likewise used as a sternutatory, largely diluted with some starchy powder.

VERB (from the Latin *verbum*, 'a word'). The various words which belong to a language have been distributed into classes, called the Parts of Speech, of which the verb is one of the principal.

The term verb comprehends those words in a language which are used to indicate the relations of mode or mood, which means manner, and the relations of time or tense. The relations of mood and tense are the essential characteristics of the verb. The mood is direct affirmation or negation, as indicative; or a way of giving a command, as imperative; or dependent or subjoined, as subjunctive; or indeterminate in itself, as infinitive. Tense refers to time present, past, or

future. The verb is also characterized by indicating the relations of subject to subject, or subject to object, whether these relations are expressed by some part of the word called verb, or by some other words which are to be viewed in relation to the verb, in order to denote these relations of subject to subject or subject to object. Thus the Latin forms *amo*, 'I love;' *lego*, 'I read,' comprehend the relations of mode, time, and subject; and the phrases 'amo puellam,' 'lego librum,' comprehend also the relation of the subject to an object. Verbs contain the notion of an activity; but this activity may be either directed from a subject to an object, or remain in the subject, as 'I love Elizabeth,' or 'I walk.' Dr. Becker observes, 'The notion of an activity is expressed by a verb, when the activity is contemplated as bearing the relations of person, time, and mood to the speaker: *e.g.*, "he drank," "he fled," "the tree grows;" it is expressed by an adjective when it is not thus related to the speaker: *e.g.*, "a drunken person," "a flighty thought," "a great tree." The notion of an existence, *i.e.*, of a person or thing which really exists, or is conceived by the mind as existing, is expressed by a substantive: *e.g.*, "a drinker," "a drink," "the flock," "the flight," "the growth."'

Dr. Becker considers, in general, all roots to be verbs, and all radical notions as notions of activity. He concludes consistently, that all substantives as well as adjectives are derived from verbs, that is, from a root which is a notion of activity; and 'all notions expressed by substantives are notions of activity transformed into notions of existence.' This theory of language involves many difficult questions as to the origin of our ideas, and for practical purposes it is of little value.

Words when reduced to their simplest forms, that is, to their roots, are neither verbs, nor nouns, nor adjectives: they are roots. The discussion whether the noun or the verb should be considered the root, in cases where both contain a common element, is a discussion about nothing at all. The element may exist in a somewhat varied form in the noun and in the verb, and the variations in each case can be referred to a particular class of verb and noun. The characteristics of the verb have been already stated.

The characteristics of the noun are the same as those of the adjective. When the characteristic marks of verb, adjective, and noun are taken away, there remains root, which in itself has no grammatical name as opposed to any other kind of word. Roots may be classified like grammatical words, but they are still roots and nothing more. The only difficulty that may be suggested as to this explanation is that the root and the noun may be identical in form, as in many instances in our own language, such as 'man,' 'dog,' &c. But though these words in themselves suggest a notion of something intelligible, they are not nouns, unless they are used as parts of speech. It is only when we view words as the constituent parts of language that we give them grammatical names.

According to Becker's principles, the verb 'to be' is not a verb: it implies 'not a notion, but a mere relation.' But 'to be' implies the notion of existence, and is the only word that does; for if we contemplate anything as existing, such as God, the notion of 'is' is inseparable from the notion God: and so of other things that are conceived as existing. All verbs also are resolvable into 'is,' and something else; and it is by virtue of this 'is' that this something else is conceived to be. The division of verbs into Active, Passive, and Neuter, is founded on the notion of a verb expressing doing, suffering, and a condition. But this division is tionable, because it introduces considerations fore the subject of grammar: it involves a metapl question. The division of verbs into Transitiv Intransitive is a grammatical division, and is A verb is transitive when it has an object which the subject, as 'I blame John.' A verb is intra when the subject of the verb is the object of the of the verb. Intransitive verbs, therefore, cons as grammatical forms, comprise what are called Verbs and Passive Verbs. Viewed with referen predication, that form of the intransitive verb wh called the neuter, as 'I walk,' differs from wh called the passive, as 'I am loved,' merely in this neuter implies nothing external to the 'I,' which object of its own energy; the passive implies some external to the subject, of which external thing subject is an object. Consequently it is only an mode of expressing the notion of the transitive The peculiar form which this so-called passive voice depends on the character of each language. Th called Reflective Verb is in form either a transitive when the subject is also expressed as its own objec a passive verb, in which the implied external thi identical with the subject.

The peculiar characters of verbs in any given langu form an important part of the study of that langu We have said that mood and tense are the characteris of a verb; but it is not necessary that the words wh denote mood and tense should be attached to the for the purpose of making a verb. The English langu contains cases where the words expressing mood tense are quite distinct from the root, which their n tions to it convert into the quality of verb. Whet such modifying words shall be attached to the root not, is an accident of language, not an essential. Th may be other adjuncts to the root besides mood and te and these adjuncts may, according to the character language, be either attached to the root, or detached fr it, though related to it. Professor Key's Latin Gram explains the form of Latin verbs, and the Rev. G. C has recently published (1867) a Greek grammar, c structed on a highly intelligible principle.

VERBASCINÆ, a natural order of plants co prising the genera *Verbascum*, *Ramondia*, *Celsia*, *Isanthera*. Three of these genera are comprised in section *Verbasceæ*, of the order *Scrophulariaceæ*, as fined by Bentham, who is followed by Lindley and oth

The genus *Verbascum* derives its name from *bascum*, which was applied to some of the species account of the bearded filaments. There are ab seventy species. *V. thapsus*, Mullein, is a native waste sterile places, especially of chalky and grav soils, throughout Europe. It is also found in Sibe the Taurus and Caucasus, and in Nepaul and Kum The leaves are remarkable for their woolly charac This plant was formerly much used in medicine, in ca of chronic catarrh and other affections of the chest, the form of infusion or decoction.

V. blattaria, Moth Mullein, is a native of the mid and south of Europe, some parts of Asia, and N America. It is not a common plant in Great Brita although in some places it is abundant. It is ca *Blattaria*, because it is said to drive away the blatt cockroach.

The genus *Celsia* was named in honour of Dr. O Celsius, professor of Greek in the University of Up Most of the species of Celsia, of which there are ab a dozen, bear showy yellow flowers, and are al

cultivated in gardens. They require more care than the mulleins.

The genus *Ramondia* was named after M. L. Ramond, a French botanist and traveller. Its flowers resemble those of Celsia. It has but one species, the *R. Pyrenaica*. It grows on the Pyrenees, and is a pretty little alpine plant without any stem, and with large purple flowers.

VERBASCUM. [VERBASCINÆ.]

VERBE'NA, a genus of plants, the type of the natural order *Verbenaceæ*. Most of the species are weeds, and are generally inhabitants of Europe and North America.

V. officinalis, common Vervain, is a native of waste ground and roadsides in most parts of Europe, and is common in England. It is not found in Ireland. The virtues formerly attributed to this plant appear to have been imaginary. *V. aubletia*, Rose-coloured Vervain, is a shrubby biennial, with the stem about a foot high, and flowers of a fine pink or crimson, larger than most of the genus. It is a native of North America. *V. triphylla*, Lemon-scented Vervain, flourishes in Chili. In Italy, Spain, and the south of France this plant is naturalized, and in Jersey and Guernsey it bears exposure all the winter.

VERBENA'CEÆ, a natural order of plants belonging to Lindley's nucamentose group of monopetalous Exogens. The species are trees or shrubs, sometimes only herbaceous plants.

Plants of this order are rare in Europe, in the north of Asia, and in the north of America; they are common in the tropics of both hemispheres, and in the temperate districts of South America. In temperate regions the species belonging to the order are herbs, but in tropical climates they are shrubs and gigantic trees.

VERDEN, a town in the province of Stade, in Hanover, is situated in 52° 56′ N. lat., 9° 15′ E. long., on the railway to Hanover, 21 miles S.E. of Bremen, and on the Aller, over which there is a bridge 400 paces in length. It is surrounded with walls and has three gates. The principal building is an ancient Gothic cathedral, one of the finest ecclesiastical edifices in the country; besides which there are two other churches. The town was made the see of a bishop by Charlemagne. The present population is about 5000. Some of the inhabitants are employed in tobacco and snuff manufactories, breweries, and brandy distilleries, but a larger number are engaged in agriculture and in the transit trade between Hamburg and Westphalia.

VERDERER, VERDURER, or VERDEROR, an officer of the royal forests, who was formerly charged with the superintendence of the *vert;* that is, of the underwood and trees of the forest, all vegetation sufficient to conceal a deer being understood by the term—the trees being called *over*, and the young shoots *under vert*. The office is still retained in some of the royal forests, but its duties now are, to inquire into and prevent all unauthorized inclosures or encroachments, and to impose fines upon offenders.

VERDIC ACID, a vegetable acid, in the state of a brittle yellow mass, which reddens litmus and does not alter in the air. When it is saturated with an alkali, ammonia for example, and exposed to the atmosphere, it absorbs oxygen and becomes gradually green. The acids then precipitate it in the form of a reddish-brown powder, which is Verdic Acid: this redissolves and becomes green with the alkalies. The earthy or metallic *Verdites* are yellow, while the *Verdates* of the same bases are green.

VERDICT. [JURY.]

VERDIGRIS. [COPPER.]

VERDITER, a blue pigment, prepared by decomposing a solution of nitrate of copper by the addition of chalk. It is a hydrated carbonate of copper.

VERDS, CAPE. [CAPE VERDS.]

VERDUN. [MEUSE.]

VERE, SIR FRANCIS, was born in 1554. He began his career of active service as one of the captains of the force sent, under the earl of Leicester, to the assistance of the Dutch in 1585, and played a leading part in the war between the Dutch and the Spaniards throughout the next fifteen years. In 1592 he obtained a seat in the House of Commons as one of the members for Leominster; but is supposed to have remained in the service of the States of Holland. He greatly distinguished himself, both in the action with the Spanish fleet, June 20, 1596, and in the successful attack upon the town of Cadiz two days after. In the summer of 1597 he accompanied the earl of Essex on his second expedition against Spain, and after his return home received from the queen the government of the Brill. He also held under the States the command of the English troops in the service of Holland. In this service he continued nearly all his life, and won great renown in the battle of Nieuport and by the defence of Ostend. He died in England, August 28, 1608. His military achievements have been recorded by his own pen in 'The Commentaries of Sir Francis Vere,' which were published in folio, at Cambridge, in 1657.

VERE, HORACE, or HORATIO, LORD VERE, the youngest of the three brothers of Sir Francis, was born at Kirby Hall in Essex, in 1565. He accompanied his brother to Holland in 1585, and shared in most of his enterprises there, as well as in the first expedition to Cadiz, for his valour on which last occasion he was knighted. In 1603 he joined the army under Prince Maurice. On the death of his brother he succeeded him both as governor of the Brill and as general of the English forces in the service of Holland. The town of Brill being delivered up to the Dutch in 1616, Sir Horace Vere was allowed a pension by James I. In 1618 he assisted the prince of Orange in putting down the Arminians, or Remonstrants, at Utrecht. In 1620 he was appointed to command the forces raised in England for the assistance of the elector palatine, Frederick V., in his attempt to secure the crown of Bohemia; and he behaved with his usual spirit in the disastrous contest which ensued. After his return home he was nominated by King James one of the council of war appointed to manage the business of the palatinate, July 20, 1624; and immediately after the accession of Charles I. was raised to the peerage. In March, 1629, he was made master of the ordnance for life, still retaining his post of commander-in-chief of the English forces in the Netherlands. He died in London, May 2, 1635.

VEREJA. [MOSCOW.]

VERGARA. [BASQUE PROVINCES.]

VERGENNES, CHARLES GRAVIER, COMTE DE, the son of a president *à mortier* of the Parliament of Dijon, was born in that town, December 28, 1717. He commenced his diplomatic career as attaché to M. de Chavigny while on his missions to Lisbon and Frankfort; and in 1750 he was appointed minister to the electoral court of Trier. Here, through his influence with the elector, he was enabled to play a very important part in opposition to the designs of Maria Theresa. Vergennes was next sent to Constantinople, where he arrived in May, 1755, receiving some months afterwards

the title and authority of ambassador. His orders were, to excite a war between Russia and the Porte; which took place, though without any material influence on his part, but in consequence of an incursion of the Cossacks into the Crimea. After his return home he lived in retirement until the fall of the duc de Choiseul, when La Vrillière sent him to Sweden. It was during his residence there that Gustavus III. accomplished the revolution which converted Sweden into an absolute monarchy. The credit of directing the king was attributed at Versailles to Vergennes, who was enrolled as a reward among the noblesse de l'épée. On the accession of Louis XVI. (July, 1774) Vergennes was made minister for foreign affairs, and so remained till his death, February 13, 1787.

VERGENNES. [VERMONT.]

VERGER (Fr. *verge*; Lat. *virga*, 'a rod'), an officer of cathedrals and collegiate churches, who carries a small mace or silver-topped rod before the dean or other clergy, on processional occasions. His duty is to preserve order and to remove offenders.

VERJUICE. An acid liquid expressed from wild apples, sour grapes, &c., used in sauces, ragouts, and the like; it is also used in the purification of wax for candles, &c.

VERMANDOIS, a district of Picardy in France, of which St. Quentin was the chief town, and which now forms portions of the departments of Aisne and Somme.

VERMES (*Worms*). Linnæus adopted this term as the title of a class, including all animals which he could not arrange under the *Vertebrata* or *Insecta*. In the 12th edition of the 'Systema Naturæ,' the Vermes are divided into *Intestina*, *Mollusca*, *Testacea*, *Lithophyta*, and *Zoophyta*. The progress of zoology since the time of Linnæus has rendered the class *Vermes* obsolete, and led to other arrangements. [ANIMAL.]

VERMICELLI, a species of wheaten paste, manufactured chiefly in Italy in the form of smooth round strings. The name has been given to it on account of its worm-like appearance, *vermicelli* in Italian signifying 'little worms.' It is chiefly used in soups, broths, &c.

Macaroni is manufactured of the same kind of paste as vermicelli, and in a similar manner; but it is rather larger in diameter, and is hollow like the tube of a tobacco-pipe. [MACARONI.]

Fedelini is a kind still smaller than vermicelli.

The paste is made of wheat stripped of the husk, and ground roughly into a sort of grit. The kind of wheat preferred by the Italians is a small hard-grained species which they now cultivate on purpose, but which they formerly imported from the coasts of the Black Sea—'Grano di Mar Nero.' The ground wheat is mixed with clear soft water, and made into a paste by kneading it on a large block. The toughness and elasticity of the paste result from a long and powerful process of kneading. It is next forced by strong pressure through round holes in the bottom of a cylinder; but to form macaroni, a wire extends from a bridge in the upper part of the cylinder through the centre of each of the largest holes, and the paste, being forced through each hole around the wire, is consequently hollow. The strings, several feet in length, whether of macaroni, vermicelli, or fedelini, having been thoroughly dried, are ready for use.

The Italians manufacture the paste into many other forms; into thin flat strips like ribbons, into thin sheets like paper, into round balls, and into beans and peas. The Neapolitans, who use great quantities of macaroni as their favourite food, use nothing pure paste of wheat and water, but the Genoe saffron with it, which gives it a yellow tinge French, who also manufacture a good deal of quently season the paste with various condiment

Macaroni and Vermicelli are subject to a $4\frac{1}{2}d$ per cwt. on being imported into the United dom. The quantity received in 1866, chiefly from was 8857 cwts., value 22,400*l.*, or rather more 2*l.* 10*s.* per cwt. The quantity exported in the year was 497 cwts., value 1257*l.*

VERMIFORM (Lat. *vermis*, 'a worm,' and 'a shape'), in Anatomy, a term applied to certain voluted and worm-shaped parts, as to a portion upper and under surfaces of the cerebellum, and prolongation of the intestinum cæcum.

VERMILION (Fr. *vermillon*; Lat. *vermiculu* bright red colour, employed in painting and the m facture of sealing wax, and consisting of

Mercury, ...	86·3	H_2S.
Sulphur, ...	13·7	
	100·0	

The cinnabar from which vermilion is obtained natural product of great purity. Its principal ch teristics are that it is insoluble in water and infu to heat. But it becomes volatilized without decom sition if distilled in contact with the air, the acti the heat and air united possessing the proper resolving it into mercury and sulphuric acid. Its densing vapours form crystalline masses, whose violet colour becomes a lively red from phosphorisa In this state it is termed vermilion; in masses mo less gross it preserves the name of cinnabar.

Three kinds of vermilion are generally used in merce: that of China, finest and most valuable; which is prepared by means of moisture; that whi obtained by the dry process. The latter is least este except when derived from Holland, where the bright hue of the vermilion is the more nearly arrived at. Chinese manufacture of vermilion is yet unknown t

In that process in which moisture is adopted, a ture is first made of 300 parts of mercury and parts of flour of sulphur; an operation extending several hours, and only consummated when the mix has become resolved into a black powder, and no of mercury can be detected. A dissolution of 75 p of potash of lime in 400 parts of water is then ad and the whole is ground into a homogeneous pap mixture is next placed in an iron boiler, finely pol and heated to the temperature of 45° Cent., in wh continues for several hours. Generally, after the sec hour, the brown hue of the mixture passes into a red brown, and then almost instantaneously into a livel The mass is then cooled by the application of cold wa is thrown into a filter; is washed carefully and d The grinding, which (as we have said) should last several hours, may be accelerated by adding to mixture of sulphur and mercury a little potash. It be rendered still easier by introducing the mixture strong bottles, well corked, and attached firmly frame, to which a rocking motion is communicated means of some active agent.

The fabrication of cinnabar by means of the dry p cess consists at first in preparing a black powder the mixture of 75 parts of sulphur with 540 parts mercury, and the exposure of the whole in an iron bo to a moderate fire. The quantities generally used

nercury are 150 pounds and 1080 pounds
the boiler being 1 foot in depth to about
meter. The black powder once obtained,
in a mortar, and introduced into earthen
le of holding three-quarters of a pint. Pots
are sand, covered with a layer of chemist's
ed in a furnace so constructed that the
p them to three-quarters of their height.
pots, when thoroughly heated, a flagon
ler is deposited. This powder immediately
flame, which rises at first to a height
at quickly subsides to about 4 inches.
ns are placed successively in each pot,
e flame, for the second time, subsides
f only 4 inches, the pots are covered with
te. They ought to be heated with great
nd the operation should last for nearly
ours. During that time, by the aid of
out 1200 pounds of powder may be dried.
troduction of the powder is achieved, the
ed for about thirty-six hours, care being
their contents every quarter or half hour
triangle, in order to accelerate the subli-
r the expiration of the appointed time, the
to burn away; and when all is cold, about
f powder is found in each receptacle, show-
cent. of 2½ on the total quantity of sulphur
employed. Nothing remains to be done
wash, and dry the powder.

is often adulterated with red-lead, red
d brick, and red arsenic. Adulteration by
three former may be recognized as follows:
ted, the vermilion becomes entirely vola-
after having heated the remainder with
it disengages itself from the acid, and a
ine powder alone remains, the adulteration
e with minium (red lead); if the remainder
pletely in the acid and colours it with a
it is adulterated with red earth; if, under
ditions, it does not give way to the acid,
dissolve, it is adulterated with pounded
eration by blood-wort is easily recognizable,
possesses the property of dissolving that
ad of receiving from it a reddish colour.
eration by red arsenic is detected by the
h that material possesses, in common with
arsenics, of emitting a peculiar odour when
conducting bodies, such as carbon. The
rmilion into the United Kingdom in 1866
86,397 lbs., value 13,217*l.* The exports
lbs., value 4119*l.*

T, one of the United States of North
the N. part of the Union, is situated
44′ and 45° N. lat., and between 71° 30′
W. long. It is about 80 miles distant
lantic, from which it is divided by New
nd Maine. It is bounded N. by the parallel
t., separating it from Canada, E. by New
S. by Massachusetts, and W. by New York,
Lake Champlain divides it for 100 miles.
length S. to N. is 157 miles; the breadth
0 to 85 miles. The area is 10,212 square
35,680 acres. The population in 1860
, including 907 free coloured, and twenty
e inhabitants, like those of the other New
es, are mainly of English descent.

Soil, &c.—Vermont constitutes a part of
mountain region which extends over most
on of the United States lying east of the river Hudson, and of Lake Champlain. The surface is very uneven, and much of it is mountainous. The Green mountains traverse the state from S. to N., and divide it into nearly equal portions. They rise near Bennington, at about 42° 50′ N. lat., and form one continuous ridge as far as about 44° N. lat., the width of which varies from 8 to 10 miles, and the length is about 75 miles. The slopes are rather gentle, but more so on the east than on the west, where in many places they are steep. In general they do not rise to more than 2000 or 2500 feet above the level of the sea, on a base which on the west may be 300 feet, and on the east 500 feet in elevation. Killington Peak, near Rutland, is 3675 feet above the sea. The summits of the mountains are rocky, and only covered with a spongy green moss: while the sides are often clothed with forests of evergreen trees—especially pine, spruce, and hemlock—from which it is supposed the name of the range is derived. The country surrounding this portion of the Green mountains on the south is of indifferent quality. The soil is chiefly stony and gravelly, but as it is well drained, it is used as pasture ground, especially for sheep. A great extent is still covered with timber trees. In proceeding northward the land improves. The soil is less stony and contains a larger proportion of rich loam or clay. The cultivated tracts are more numerous and extensive, and the crops more abundant, especially along the banks of the Connecticut, where some very fertile districts are found.

At about 44° N. lat. the southern ridge of the Green mountains, spreading out to the E. and W., becomes about 20 miles wide, and is here intersected by a depression, through which the Onion River flows to Lake Champlain. On the south side of the Onion River is the Camel's Rump, 4188 feet high; on the north side of the River is the Mount Mansfield, 4359 feet high. Farther to the north the Green mountains extend between Richmond and Danville to a width of about 40 miles.

North of 44° 40′ the mountain region narrows to about 20 miles, and its sides are inclosed by two uninterrupted ridges, of which the western, occupying about the middle of the state, runs nearly due N. into Canada, where it terminates not far from the banks of the St. Francis River, about 45° 25′ N. lat. The eastern ridge runs N. by E. a few miles from the banks of the Connecticut, enters Canada near the commencement of that river, and terminates at the sources of the St. John of New Brunswick. Both ridges attain an elevation of 2000 to 2500 feet above the sea-level. The tract inclosed by them is much inferior in fertility to the region farther south.

The most fertile part of Vermont is that which lies on the banks of Lake Champlain, and may be called a plain, though the surface is broken by numerous watercourses. This plain is about 100 miles long, and in its southern districts less than 10 miles wide, but towards the north it widens to 30 miles. The soil varies greatly, but a large portion of it is productive. The greater portion of the state is of primary formation, though the valleys of the rivers are mostly alluvion, and the shores of Lake Champlain transition formation. On the western side of the mountains the rocks are principally old red sandstone, graywacke, limestone, calciferous sandstone, and granular quartz, containing iron ore and manganese; hornblende, mica slate, granite, and gneiss form the body of the hills; serpentine occurs both in the southern and northern part of the state. Along the Connecticut is a continuous bed of clay slate. There is an extensive deposit of primitive limestone in Caledonia county. The

eastern slope of the mountains is composed mostly of hornblende rock, gneiss, granite and clay slate. Along the western part of the state a great belt of quartz is covered by a bed of crystalline limestone 2000 feet thick.

Vermont abounds in picturesque and sublime landscapes, and has some beautiful waterfalls, including the Great Falls on the Lamoile, with a descent of 150 feet; the Falls of the Clyde, and Bellow's Falls on the Connecticut. Lake Willoughby, N. of St. Johnsbury, is becoming a fashionable resort, on account of its attractive scenery.

Rivers and Lakes.—The state is studded with small lakes, and is altogether well watered, though there are no large rivers with their courses entirely within its boundaries. More than two-thirds of the drainage runs into Lake Champlain, which is navigable by large vessels. [CHAMPLAIN, LAKE.] The largest rivers falling into that lake are Otter Creek, Onion River, the Lamoile, and the Missisqui, of which, however, only the first and last are navigable. Otter Creek rises on the western declivity of the Green mountains, near 43° 15′ N. lat., and runs N. by W., nearly parallel to Lake Champlain. Its course exceeds 70 miles, and the largest lake vessels may ascend it to Vergennes, about 8 miles from its mouth, where the first falls occur. The Onion River and the Lamoile originate in the mountain region of the centre; and as they descend from a high level and have only a short course, their current is very rapid and interrupted by falls, so that no part of them is navigable. The Missisqui rises in Canada, and falls into Missisqui Bay, an arm of Lake Champlain, which is about 15 miles long and 3 wide, and in its whole extent navigable for such vessels as are commonly used on the lake. The northern portion of Missisqui Bay is within Lower Canada. A few small rivers which drain the northern district of the mountain region fall into Lake Memphremagog, which belongs to Canada, but about one-fifth lies within Vermont. This lake is nearly 30 miles long, but in no part exceeds 4 miles in width.

The river Connecticut, which runs between Vermont and New Hampshire for about 170 miles, is not navigable in the upper part of its course, where it presents a continual succession of rapids and cataracts; but from Haverhill (44° N. lat.) downwards it is navigable for boats in certain seasons. All the streams falling into the Connecticut from the Green mountains are small, and none of them navigable.

Climate.—Vermont is distinguished by the length and severity of its winter, which are beyond what could be expected from either latitude or elevation, yet it is one of the healthiest states in the Union. The excessive cold must be attributed to the north and north-west winds that prevail in the winter, and which, before reaching this state, pass over the wide plain of Canada, where their force is not broken nor their intensity moderated by any range of hills. The frost continues almost without interruption from early in December to the beginning of April, and is very intense. The snow lies from the middle of December to the middle of March, and is often from 4 feet to 6 feet deep on the hill sides. In summer, from June to August inclusive, rain is scarce, and the heat in the middle of the day is oppressive. The most pleasant season here is from the beginning of September to the middle of October, the heat being then moderate, and the air dry, elastic, and invigorating. The extremes of temperature are 17° below zero, and 92° above.

Products, Commerce, &c.—Though it is a mountainous country, Vermont has a large proportion of

cultivable soil, and the valleys of the rivers have a rich, fertile, alluvial deposit especially adapted for grain. Many of the hills are cultivated to their summits; and the rougher and more mountainous portions afford excellent pasture for sheep and cattle. At the time of the last census there were in the state 2,823,157 acres of cultivated land, and 1,451,257 still remained unimproved. The total number of farms is about 30,000, and the live stock is estimated to be worth more than 4,000,000*l.* In proportion to its population, Vermont produces more wool, live stock, maple sugar, butter, cheese, hay, hops, and potatoes, than any other state in the Union; in addition to large quantities of Indian corn, oats, wheat, rye, barley, peas, beans, fruit, including very superior apples, grass seeds, bees-wax, honey, tobacco, wine, molasses, and silk cocoons. Besides the forests of hemlock, fir, and spruce on the mountains, the oak, pine, hickory, sugar maple, elm, butter-nut, beech, basswood, and birch, grow on the lower tracts, and cedars in the swamps. The animals include bears, black cats, wild cats, deer, foxes, hares, martens, ermines, porcupines, raccoons, skunks, several kinds of squirrels, weasels, and wolves. In the rivers and lakes are beavers, musk-rats, and otters. The Connecticut was once famous for its abundance of salmon, but they have disappeared: shad, however, are still taken. Vermont possesses many valuable minerals. Iron is found in abundance—bog ore throughout the state, but the best ores of the tertiary age are along the western base of the Green mountains. A bed of brown coal, in connection with iron, exists in Brandon. Very great quantities of copperas are made from iron pyrites, or sulphuret of iron. Of other metals there are titanium, oxide of manganese, lead, magnetic iron ore, plumbago, copper, and zinc. A lump of gold was discovered in Newfane, in 1826, weighing 8½ ounces; this precious ore also occurs near the towns of Bridgewater and Strafford. Granite suitable for building stone in abundance, and vast beds of fine marble, are found. The marble quarries at Middlebury are particularly celebrated. A black variety of this beautiful building material is extensively quarried at Swanton, on Lake Champlain. A fine oil-stone is manufactured into hones, from a small island in Lake Memphremagog. Slate quarries are worked on the Connecticut. Kaolin (porcelain clay) of excellent quality, soapstone, limestone, steatite, (in great abundance in Grafton, where it is largely quarried), talc, and marl, all exist in this state. Fine white marble is found all along the base of the Green mountains, for 50 miles above and below Rutland, at which town an extensive trade is carried on in this article. Manganese and slate are mined and quarried in the same vicinity. Agriculture being the occupation of the majority of the inhabitants, the population of Vermont is not so extensively engaged in manufactures as most of the other New England states, though it has water power enough to supply the whole country. The most numerous and important of the industrial establishments are woollen and cotton factories, marble works, tanneries, iron foundries, and factories for the production of steam-engines and other machinery, carriages, &c.

All the commerce connected with navigation is carried on by way of Lake Champlain; and the foreign trade is mostly through New York and Massachusetts. In a recent year (1862-63) the foreign exports amounted to 736,663 dollars; and the imports to 2,567,892 dollars. The state is crossed and intersected by numerous railroads, including two over the mountains, which afford the means of communication with all the principal

towns in America; and the Grand Trunk line, extending from Portland to Montreal, runs along the N.E. for 35 miles. Two fine railway bridges cross the two arms at the head of Lake Champlain. There are altogether about 600 miles of this 'iron road,' the construction and equipment of which cost not less than 5,000,000*l.*

Constitution, Education, &c.—The internal affairs of the state are under the direction of a governor, lieutenant governor, Senate, and House of Representatives, who are each elected annually by the popular vote. The governor's official salary is 750 dollars, or about 156*l.* per annum; and the lieutenant governor, who is *ex officio* president of the Senate, is paid 1*l.* per day during the sessions of the legislature. There are thirty senators and 230 representatives, all of whom receive two dollars per day while they sit. The judicial establishment includes a supreme court, county courts, and a court of chancery. The ordinary expenses of government are 80,000 dollars, and there is no public debt. The state sends two senators and three representatives to Congress, and has five votes in the choice of the president of the United States. Every male citizen, twenty-one years of age, who has resided in the district twelve months, is entitled to a vote.

Vermont contains 697 churches, or one to every 450 persons. Of this number 178 belong to the Congregationalists, 171 to the Methodists, ninety-eight to the Baptists, eighty-two to the Unionists, fifty-five to the Universalists, thirty-three to the Episcopalians, twenty-seven to Roman Catholics, eleven to Presbyterians, eleven to 'Christians,' and five to the Friends. The educational establishments include three colleges, 2696 public schools (with 80,904 pupils), ninety-six higher schools, and several theological and medical institutions. There are also 211 public libraries, containing 101,000 volumes, and 450 private, school, or church libraries, containing altogether more than 130,000 volumes. At Montpelier a Historical Society has been established, and at Brattleborough is an asylum for the insane, usually containing from 400 to 500 inmates. The state prison is at Windsor, and though the services of the convicts are let out to contractors, the expenditure exceeds the income by about 800*l.*

Towns.—Vermont is divided into fourteen counties. The following are the principal towns, with the population of each in 1860:—*St. Albans*, 63 miles N.W. by N. from Montpelier, is situated on elevated ground, 3 miles E. from Lake Champlain. Population of the township, 3637. *Bennington* [BENNINGTON]. *Burlington*, W.N.W. from Montpelier, is on the shore of Lake Champlain. It is the largest and most commercial town in the state. It has good wharves and a lighthouse, and steamboats ply regularly to and from Whitehall and other places on the lake. The town is well built, and beautifully situated. It contains the state university, a medical school, library, court-house, gaol, and several churches. Population, 7713. *Brattleborough*, on the Connecticut, has a lunatic asylum, and 4000 inhabitants. It is a favourite health resort. *Danville*, 24 miles N.W. from Montpelier, contains the usual public buildings, and 2577 inhabitants. *St. Johnsbury*, 32 miles N.E. of Montpelier, has a population of 3469. *Middlebury*, 35 miles S.W. from Montpelier, is situated on both sides of Otter Creek, at the falls, which afford extensive water power. The town is irregularly laid out, but well built, and contains Middlebury Divinity College, a court-house, gaol, and churches. There are valuable marble quarries in the neighbourhood. Population, 4000, some of whom carry on manufactures of woollen and cotton goods. *Montpelier* is the capital of the state. It is situated in 44° 16′ N. lat., 71° 33′ W. long., at the junction of the two branches of the Onion River. It is a place of great trade in consequence of the valley road of the Green mountains passing through it. It contains a handsome state-house, several churches, and 3000 inhabitants. *Newbury*, 19 miles S.E. from Montpelier, is situated on the west side of the river Connecticut. Population of the township, 2549. *Rutland*, 62 miles S.W. from Montpelier, is situated on Otter Creek, and contains a court-house, churches, and 7577 inhabitants. It is an important railway centre; and in the neighbourhood are quarries of a beautiful white and clouded marble. *Vergennes*, which is prettily situated on Otter Creek, 7 miles from its entrance into Lake Champlain, and on the Rutland and Burlington Railway, 22 miles S. of Burlington, was incorporated as a city in 1783. The creek is here about 500 feet wide, and is navigable for the largest vessels on the lake. The town contains three or four churches, a bank, and a United States arsenal, which was erected in 1828, and is the only military establishment in Vermont belonging to the general government. Considerable quantities of arms and other munitions of war are constantly stored here. At one time there were extensive iron works in the city and neighbourhood, but most of them were suspended in 1816, and have only been partly resumed since. They were in active operation during the late civil war (1861-65), when they produced 177 tons of cannon shot, besides other warlike implements. There are three distinct sets of falls, which afford excellent hydraulic power. Population of the city, 1286. Vergennes was first settled in 1766 by Donald McIntosh, who was a native of Scotland, and had fought at the battle of Culloden. The flotilla which captured the British fleet on Lake Champlain, September 11, 1814, was fitted out at this place. *Windsor*, a picturesque town, 65 miles S.S.W. from Montpelier, is situated on the west bank of the Connecticut, between two streams, one of which supplies good water power. It is on a branch railway connecting it with several important trunk lines. There is a bridge across the river. The town consists of spacious streets, finely shaded with trees, and lined with handsome residences and shops. It contains the state prison. Population, 1669. *Woodstock*, 51 miles S. from Montpelier, is watered by the river Otta Queechee and its branches, and by the Beaver Brook, all of which supply hydraulic power. Population of the township, which includes another village, 3062.

History and Constitution.—The tract of country between Lake Champlain and Montpelier, called Vermont by the French settlers from its green mountains, was ceded by them to the British in 1763. The French had commenced their settlement as early as 1731, and the provincial government of Massachusetts had built a fort on the west bank of the Connecticut in 1724; but as the natives were numerous and hostile, little progress was made in colonizing Vermont till the British had conquered Canada in 1760, after which time it began to be settled rapidly. Vermont was at first claimed by Massachusetts, and afterwards by New Hampshire and New York. The rival claims were decided by the king of England in council in 1764, in favour of New York. A serious quarrel was the result of this decision, which was interrupted by the war of the Revolution, in which 'the Green-mountain boys,' as they were called, distinguished themselves by their hardiness and bravery. In January, 1777, they declared the

state independent, but New York still claimed jurisdiction, which the inhabitants stoutly resisted. The differences, however, were finally adjusted in 1790 by Vermont paying to New York 33,000 dollars in full of all demands. In 1791 Vermont was constituted a state, and was the first new member of the American Confederacy added to the original thirteen. In Vermont was fought the battle of Bennington, August 16, 1777, when the British were defeated in two engagements by a superior force.

VERNAL, VERNAL EQUINOX. The word vernal is the adjective derived from *ver*, 'the spring;' and the vernal equinox is that point of the equator which the sun crosses when it passes into the hemisphere of the observer, and when the days begin to be longer than the nights. Consequently that point of the ecliptic which is called the first point of Aries is the vernal equinox to those in the northern hemisphere, while the first point of Libra is the same to those in the southern.

VERNATION, in Botany, signifies the manner in which the young leaves are arranged within the leaf-bud. It is equivalent to the expressions Foliation and Præfoliation. It corresponds also to the terms Æstivation and Præfloration, which indicate in what manner the parts of the flower are arranged in the flower-bud.

VERNET, ANTOINE CHARLES HORACE, commonly called Carle Vernet, a French historical painter, was born at Bordeaux, August 14, 1758, and was the pupil of his father, Claude Joseph Vernet. In 1787 he was elected a member of the French Royal Academy of Painting for a large picture of the Triumph of Paulus Æmilius, and he was subsequently, after the remodelling of the Academy, nominated a member of the Institute of France. In 1806 he was appointed painter to the Dépôt de la Guerre; and he was made subsequently Chevalier of the order of St. Michel, and a member of the Légion d'Honneur. His works are very numerous. He died September 27, 1836.

VERNET, CLAUDE JOSEPH, was born at Avignon in 1714, and received his first instructions in painting from his father, Antoine Vernet, and Adrian Manglard, an historical painter. He studied with Fergioni at Rome, and remained in Italy twenty years, including some time spent in Greece and the Greek islands. During part of this period he was very poor. He made elaborate sketches of the most beautiful places which he visited, and painted several admirable pictures in Genoa, in Naples, and in Rome.

In 1743 he was made a member of the Academy of St. Luke; and about the same time he married Miss Parker, the daughter of an English officer in the pope's marine. Vernet's reputation as a marine painter at length reached his own country, and in 1752 he was invited by Louis XV. to Paris. Here he was soon after elected a member of the French Academy of Arts. In 1753 he was commissioned by the government to paint pictures of the principal seaports of France. He painted fifteen views, which are now in the Louvre. He was in consequence of these works elected, in 1766, one of the council of the Academy, and Louis XV. gave him apartments in the Louvre. From 1752, when he returned to France, until the year of his death, 1789, Vernet painted upwards of 200 pictures, most of which have been engraved. He excelled in representing water in any state, but particularly when disturbed and boisterous. He was least successful in shipping, being deficient in a competent knowledge of the rigging and construction of vessels.

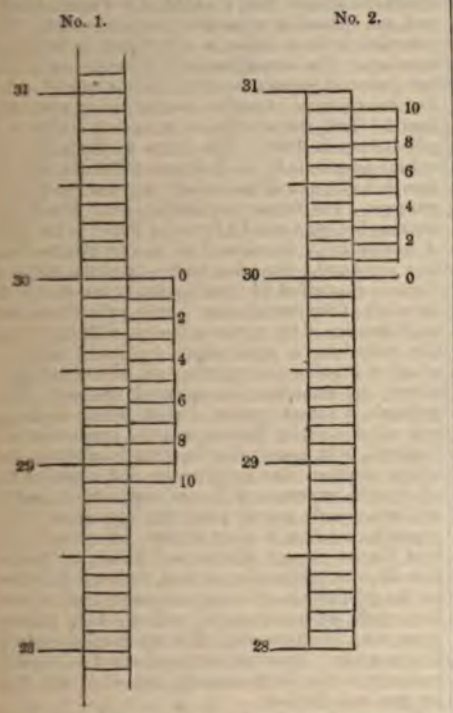
VERNET, EMILE JEAN HORACE, the greatest of battle-painters, was born in Paris on the
June, 1789. He came of an artistic lineage; h
Carle Vernet, was distinguished as a painter,
ceived Napoleon's patronage; and his gra
Claude Joseph Vernet, had also earned renow
same illustrious profession. Horace Vernet sh
family bias at an early age, and maintained hi
his drawings when only fifteen years old. In s
precocious, he had married, served as a sol
exhibited pictures at the Louvre before attai
majority. His military career was brief, but i
of great advantage to him in his after caree
artist. He acquired distinction as an artist w
poleon was still at the zenith of his glory,
rewarded with a first-class medal for historical
in 1812. In 1814 he received the cross of the
of Honour. His first great battle-piece, the B
Tolosa, was exhibited in 1817. It attracted
attention, and established Vernet's reputation
artist of extraordinary facility, wonderful pow
observation, and remarkable fire and vigour of exe
The Massacre of the Mamelukes appeared in
the Barrière de Clichy, in 1820; and Mazeppa's
in 1825. In this same year he was made officer
Legion of Honour. In 1826 he was elected a m
of the French Institute, and painted his fine pict
Mazeppa and the Wolves. Having visited Rome,
he resided for about nine years, he was made dire
the French Academy; and as if his genius was
lated by the *religio loci*—by the glorious treasu
art and antiquity around him—it was at Ro
produced his admitted masterpieces. He after
travelled in Algeria to collect materials for his c
records of its conquest by the French; such
Storm of Constantine, 1839; Capture of A
Kader, 1843; and the Battle of Isly, 1844.
Universal Exhibition of 1855 held at Paris,
exhibited twenty-two pictures, which furnished
idea of his industry, enthusiasm, and ability. He
full of years and honours, January 17, 1863,
seventy-fourth year of his age. Few of his p
have been purchased by English connoisseurs,
they so much esteemed here as in his native co
Their popularity is in some measure due to their su
which flatter the military vanity of the French;
must be owned that, in their peculiar style, they
foremost place.

VERNEUIL. [EURE.]

VERNIER, a scale by which linear or angular
nitude can be read off much more accurately th
possible by ordinary mechanical division and subdiv
It is so called from its inventor, Pierre Vernier,
first introduced it in 1631. We shall briefly ex
the principle of its action in its simplest form.

Number 1 is the figure of a vernier for meas
hundredths of an inch, such as is usually appli
common barometers. The scale is on the left han
which the inches and tenths are marked. The p
on the right hand, which can be slipped up or d
remaining always in contact with the scale, is the ve
It is merely a length of eleven parts of the pre
scale divided into ten equal parts. Each of these
therefore equals $\frac{1}{10}$ of an inch, or ·11 and the diff
between a part of the scale and a part of the ve
is ·01 inch. In the figure the zero of the verni
made to coincide, i.e., to form one continued lin
the division 30 on the scale, and consequently 10 o
vernier also coincides with 28·9 on the scale. Div
1 on the vernier is, from what we have said, ·11

below zero of the vernier, while the next lower division on the scale is only ·10 below it: hence the vernier division 1 is ·01 inch below the division 29·9 on the scale. For the same reason, division 2 on the scale is twice as much, or ·02 below 29·8 and so on, the divisions on the vernier overlapping those on the scale until 10



on the vernier stretches over to exact coincidence with 28·9 on the scale. Now suppose the vernier to be raised ·01 inch, it is evident that division 1 of vernier will coincide with 29·9. If the vernier were raised ·02 inch, the vernier division 2 would coincide with 29·8, and so on; so that in order to read off the hundredths of an inch which the vernier zero advances beyond any tenth in the scale, we have merely to see what vernier division comes nearest to a division of the scale, and set that down for the hundredth required.

This is the form which was given to the vernier by its inventor, in which the parts of the vernier are larger than those of the scale, and in which the numbering of the parts of the vernier runs contrary to the numbering of the scale. But if, as in No. 2, the vernier has the length of nine divisions of the scale, and this is divided into ten equal parts, each part will be equal to ·09 inch, while the divisions of the scale are equal to 1 inch. The vernier in this form is to be numbered forwards, as well as the scale. It is clear that raising the vernier ·01 will bring the division 1 of the vernier into coincidence, and so on, exactly as before; and therefore that the inches and tenths being read from the scale, the hundredths are to be taken from the vernier. The reading both scales forward is some advantage in favour of the latter mode, while the size of the vernier divisions is larger and consequently clearer in the first.

VERNON. [EURE.]

VERNON, ROBERT, F.S.A., of Ardington House, Berkshire, and founder of the National Gallery of British Art, was born in 1775. There is little in his private life to interest the biographer; but in the collection of paintings which he presented to the British nation he has left an enduring name. It is sufficient to say, that by a long course of activity and industry in the business to which he applied himself—the breeding of horses—he succeeded in realizing a sufficient fortune to enable him to expend in works of art above 150,000*l.*; and this was not for the mere vanity of buying, but for the encouragement of art; for he always made it a rule to purchase, not from the dealer, but from the artist himself. The so-called 'National Gallery,' with which his name is historically associated, was first established in 1824, by government purchasing Mr. Angerstein's collection of paintings. But the gallery received very few additions; and not a single British one was purchased. At length Mr. Vernon came forward as the generous patron of Art, and conceived the idea of presenting his rich collection of pictures to the nation, with the view of forming the nucleus of a gallery of British painters. The offer was accepted by the government, and the Vernon Collection, consisting of 157 valuable pictures, was made over by a deed of gift, in 1847, to the trustees of the National Gallery. He died in 1849.

VERNONIA'CEÆ, a tribe of plants belonging to the natural order *Compositæ*, contains several genera, which are chiefly inhabitants of America: there are a few in Asia and Africa, but none in Europe. The most interesting genus (*Vernonia*) is the type of this tribe.

VERO'NA, a strong fortified city of northern Italy, and the chief town of a delegation in the province of Venetia, is situated 72 miles W. of Venice, in 45° 26′ N. lat., 11° E. long., on the Adige, which divides it into two parts, and at the foot of hills which are the lower offsets of the mountains of the Tyrol. Its situation is pleasant and salubrious, but from its vicinity to the Alps the climate is somewhat cold—the breeze from the mountains being always fresh, and sometimes biting. The Adige, which is a very rapid river, occasionally overflows its banks, and these inundations are usually very destructive. Verona is noted for the beauty of its environs, which are dotted with cypresses, villas, and old feudal castles, while the blue hills and mountains of the Alps form the northern background. From its situation near the gorges of the Tyrol, it has always been considered an important position for the defence of Upper Italy. The city, which is substantially built with long and tolerably wide streets—especially the Corso—is surrounded by old walls flanked with towers, and retains much of the appearance of a town of the middle ages. The ramparts and bastions constructed by the architect and engineer, San-Micheli, in the early part of the sixteenth century, were destroyed according to one of the conditions of the peace of Luneville in 1801; but on the city passing into the hands of the Austrians in 1815, the defences were partly restored; and after the war with Sardinia in 1849 every nerve was strained to make it as strong as possible. Indeed, the modern fortifications are among the most remarkable works of military engineering in Europe; and include many bastions, detached forts, an entrenched camp, and a garrison capable of accommodating 20,000 men. The city is a member of the celebrated 'Quadrilateral'—composed of Mantua at the south-west angle, Legnago at the south-east, Peschiera at the north-west, and Verona at the north-east—the strength of which, it is believed,

induced Napoleon III. to propose the peace of Villafranca in 1859. The two fortresses of Peschiera and Mantua command the line of the Mincio, and Verona and Legnago that of the Adige.

Among the many remarkable buildings of Verona the most worthy of notice are—the splendid palace Canossa, built by San-Micheli; a modern palace called della Gran Guardia, in the Piazza di Brà; the elegant palace Guasta Verza, by San-Micheli; and the palace Bevilacqua, whose once rich museum has been dispersed: the finest of its ancient sculptures are now at Munich. The palace Ridolfi has a curious representation of the cavalcade of Pope Clement VII. and Charles V. on the occasion of that emperor's coronation at Bologna. The palace del Consiglio is built from the design of Sansovino, but its spacious hall was constructed by Frá Giocondo, the commentator of Vitruvius. Statues in marble or bronze of the celebrated natives of Verona—Paul Veronese, Catullus, the younger Pliny, Maffei the historian, Vitruvius, Cornelius Nepos, &c.—adorn the façade of this building. The custom-house is a noble edifice, raised in the last century by Count Alessandro Pompei. In the Miniscalchi palace are valuable collections of armour and of oriental MSS. The palaces of the Scaligeri, lords of Verona, are now converted into municipal buildings. From their midst a huge *campanile* rises to the height of more than 300 feet. The exchange, the bishop's palace, three theatres, some hospitals, and several magnificent fountains, deserve mention among the public buildings of the city, which also contains some handsome squares. The ecclesiastical edifices of Verona are numerous, and many of them interesting for their monuments and paintings. The church of SS. Nazario e Celso is said to be of the seventh century. The subterranean galleries in its neighbourhood were once used as catacombs. The church of San-Zenone dates from the ninth century: its bronze gates, a statue of the saint and his tomb, and its curious emblems, arabesques, and figures, attest its antiquity. It possesses a beautiful *campanile*, or bell-tower; and is altogether the most interesting example in the city of the ecclesiastical architecture and decorations of the middle ages. The cathedral, a Gothic building, said to be of the age of Charlemagne, with its façade covered with old sculptures of men and animals, contains the tomb of Pope Lucius III., who died at Verona in 1185, several valuable paintings (including a fine Assumption by Titian), a sepulchral monument of the Roman times bearing the names of Julius Apollonius and his wife Attica Valeria, and other interesting objects. The church of San-Fermo has a fine mansoleum of the Turriani family, many other beautiful monuments, and also several very old paintings, one of which, by an unknown artist, is said to be anterior to the time of Cimabue. The churches of Santa Maria della Scala, San-Giorgio Maggiore, and San-Sebastiano, are among the finest in Verona, and are rich in paintings. St. Anastasia is remarkable for its great size, its monuments, paintings, and altars; and San-Stefano contains the tombs of twenty of the bishops of Verona. The total number of churches is about forty. The picture gallery of Verona contains about 400 specimens, including a Transfiguration by Titian, and a full length portrait and a Deposition by Paul Veronese. The library of the Cathedral Chapter is very ancient: it contains 12,000 volumes and about 540 MSS., among which is a palimpsest of the Institutes of Gaius. It was in this library that Petrarch discovered Cicero's Epistles 'ad familiares.' The Teatro Filarmonico is a handsome structure; in the court and under the portico is Maffei's collection of Etruscan and other inscriptions, and of ancient bassi rilievi. The sepulchral monuments of the Della Scala family, in the shape of Gothic pyramids, surmounted by the equestrian statues of the various members of that family who were lords of Verona, are remarkable objects. They are situated in a small churchyard, and inclosed by a beautiful iron trellis-work. The pretended tomb of Juliet is still visited by credulous travellers. The amphitheatre of Verona, one of the best preserved monuments of its kind, is noticed under AMPHITHEATRE. Another classical monument, the Arco de' Gavii, the sepulchre of an ancient family, was pulled down in 1805. The Porta de' Borssari, said to have been built by the Emperor Gallienus; and the Arco de Leoni, also of the imperial age, are fine Roman gateways. The former is a double arch. The handsome modern gate called 'Porta del Palio' is the work of San-Micheli. Remains of an ancient theatre have been discovered. Four fine bridges cross the Adige at Verona: that called Di Castelvecchio is remarkable for the width of the central arch. Among the educational establishments of the city are a lyceum, with fine scientific collections, a royal college for young ladies, a school of drawing and painting, an academy of agriculture and commerce, an episcopal seminary, three gymnasia, a botanic garden, a philharmonic academy, two valuable public libraries, and the museum of the Lapidario, with remarkable Etruscan inscriptions and ancient marbles. The amphitheatre, and several of the other public structures of Verona, are built of marble, and consequently present a very fine appearance. The population amounts to about 60,000. A railroad runs from Verona, through Vicenza and Padua, to Venice. Raw silk, rice, garlic sausages, wool, timber, and leather, are the chief articles of commerce: woollen, silken, and linen stuffs are manufactured, and also hats, hosiery, paper, soap, jewellery, &c. The city is celebrated for its dye-works. Excellent cattle are reared on the rich pasturage in the neighbourhood; and wines and fruit are good and abundant.

From its fine situation, military importance, rich historical remains, and literary institutions, Verona has always been considered one of the most interesting towns in Italy. This interest is increased to all lovers of the English drama, by the fact that it is the scene of Shakespeare's tragedy of 'Romeo and Juliet.' Its early history is not positively known, but it is supposed to have been founded in the fourth, and to have been subjected to the Romans in the second, century before the Christian era. It afterwards rose to great importance, and was adorned with numerous magnificent structures. It was captured by Constantine in 312; and on the decline of the Roman empire it was taken by the Goths, and made by Theodoric the capital of his empire. The Goths were defeated by Stilicho in 402; and in 774 Verona was taken by Charlemagne, whose son, King Pepin, resided here; and so long as the power of the emperors in Italy lasted, it took a lead among the Italian cities. It afterwards (in 1405) became an independent republic, lost its liberty under lords of its name who ruled it with despotic sway, passed through the hands of various masters, and at length, weary of the vicissitudes to which it had been subjected, voluntarily ceded itself to Venice, under which it remained till 1797, when it became part of the kingdom of Italy, under French domination. In 1814 it was transferred to Austria, to which empire it belonged till 1866, when, with the rest of Venetia, it was

added to the new kingdom of Italy. Verona was the birthplace of Scipione, and of Fracastoro, the poet and physician, besides the celebrities already mentioned.

The delegation of Verona has few other towns of any consequence. *Legnago*, a fortress of considerable strength, and one of the Quadrilateral, is on the Adige, and has 6000 inhabitants. It has several churches, convents, and barracks, a theatre, hospital, gymnasium, a leather manufactory, and some trade in corn, rice, and silk. It was fortified in the sixteenth century, and taken by the French in 1796. *Villafranca*, a bustling market town on the road from Verona to Mantua, which at one time was strongly fortified, is memorable in modern history as the place where the treaty between the French and Austrian emperors was signed, on the 11th July, 1859, at the close of the Italian war. Its population is about 7000. *Rivoli*, twelve miles N.W. of Verona, on the right bank of the Adige, and surrounded on all other sides by mountains, is famous for the battle won there by Bonaparte and Massena over the Austrians, January 14, 1797. The latter was rewarded by the title of Duke of Rivoli for his services on this occasion. On the eastern shore of the Lake of Garda are the villages of *Malsesine*, with an old Gothic castle, and *Garda*, which last has given to the lake its modern name. In the mountains near Verona is *Gargagnago*, where Dante lived some time as the guest of Can della Scala, and wrote part of his 'Purgatorio.' The valley of Ronca, 15 miles distant from Verona, is worth the notice of the geologist for its fossil fishes and shells. The natural bridge of Veja is also a remarkable object.

VERONE'SE, ALESSANDRO, was born at Verona about 1582. His family name was Turchi or Turco. Having shown some talent for drawing, the painter Felice Brusasorci took him as a colour-grinder in his studio, and encouraged him. He soon surpassed his master, and after his death, in 1605, completed some of his unfinished works. He afterwards went to Venice, where he obtained employment from Carlo Saracino. He ultimately established himself in Rome, and formed a style which combined many of the beauties of the Roman and the Venetian schools. His principal works are in Verona, and of these a Pietà and the Passion of the Forty Martyrs are among the best. Alessandro died at Rome, according to Pozzo, in 1648, but according to Passeri, in 1650.

VERONESE, PAOLO. [CAGLIARI, P.]

VERO'NICA, a genus of plants belonging to the natural order *Scrophulariaceæ*. The flora of Great Britain contains about twenty species. *V. spicata*, Spiked Speedwell, is a native of Germany, France, and Switzerland, and is found in England in some parts of the county of Suffolk. *V. officinalis*, common Speedwell, is indigenous in Europe and North America, in woods and on dry sandy banks, and is plentiful in Great Britain. It has pale blue-coloured corollas with veins of deeper blue. *V. Beccabunga*, Brooklime, is a glabrous shining plant, native of every country in Europe, and is also found in North America and Nepaul, and is abundant in Great Britain. It grows in ditches, rivulets of clear water, and in running streams. It has racemes of deep-blue flowers marked with veins of red. *V. montana*, Mountain Speedwell, belongs to Europe, but is not very common in Great Britain. It is generally found in woods and groves on a calcareous soil, but not always in mountainous districts, as its name would infer. *V. chamædrys*, Germander Speedwell, is sometimes known by the name of Bird's-eye, and is often mistaken for the Forget-me-not. *V. Teucrium*, Germander-leaved Speedwell, flourishes in Italy, Switzerland, and Germany in clayey soils. *V. longifolia*, Long-leaved Speedwell, is a native of the continent of Europe and Siberia. It is very changeable in its characters, and a great number of varieties have been recorded. *V. decussata*, Cross-leaved Speedwell, is found in the Falkland Islands and the Straits of Magalhaens, and with care may be cultivated in the open air in this climate.

VERONICA (from Lat. *vera*, 'true,' and Gr. εἰκών, 'an image'), the name of a fabulous saint in the Roman Catholic calendar, for a belief in whose existence no good grounds have been established The legend runs, that a woman so named met our Lord when sinking under the weight of his cross which he bore towards Calvary, and that she offered him her handkerchief or veil to wipe the sweat from his face. The act of pity was recognized and rewarded, the handkerchief being returned to Veronica with an imperishable likeness of the divine features imprinted upon it. This wonderful relic has been preserved at St. Peter's in Rome since 700. Some writers suppose that Veronica was an actual personage, whatever may be thought of the story connected with her; others that the name was originally applied to the picture, which they accept as genuine, and afterwards made use of in the creation of a new saint. The picture has been several times copied in painting and engraving, especially by the Spanish artist Morales, who introduces it in his Ecce Homo.

VE'RRIO, ANTO'NIO, was born at Lecce about 1639, and after he had made some progress in painting, he visited Venice and Naples, and at the latter place, in 1660, he painted in fresco Christ healing the Sick, in the college of the Jesuits. He afterwards went to France, and painted the high altar of the Carmelites at Toulouse. Shortly after this Charles II. invited him to England, and intrusted to him the decoration in fresco of Windsor Castle. He painted most of the ceilings of the palace, one side of St. George's Hall, and the chapel, and likewise the great staircase at Hampton Court. But few of his compositions are now left. Verrio was paid enormously for these and many other works which he painted in England. After the accession of James II. he was again employed at Windsor in Wolsey's Tomb-house, then destined for a Roman Catholic chapel. He also painted James and several of his courtiers in the hospital of Christchurch, London. After the Revolution he refused to paint for William III. He executed, however, the extensive works for Lord Exeter at Burleigh House, which are considered his best productions, and he painted also at Chatsworth and at Lowther Hall. Queen Anne granted him a pension of 200*l.* a year, but he did not enjoy it long. He died at Hampton Court in 1707. Walpole has described his artificial and insipid style with great piquancy, and he has been satirized by Pope as 'sprawling Verrio.'

VERRO'CCHIO, ANDRE'A DEL, was born at Florence in 1432. He was, according to Baldinucci, a scholar of Donatello. He first distinguished himself as a goldsmith, both at Florence and at Rome; he then devoted himself solely to sculpture in bronze and in marble. One of his best works is the Incredulity of St. Thomas, in the church of Or San-Michele, at Florence, finished in 1483. In this work, says Vasari, Verrocchio left nothing to be wished for; and having attained perfection in sculpture, he began to turn his attention to painting. Bottari says that he was one of the first who made plaster casts from living and dead subjects. He also assisted Orsino in his wax figures; and with his other accomplishments he combined a good knowledge

of geometry and great practical skill in music. He died at Venice in 1488.

VERRUCA'RIA, a genus of plants belonging to the natural order of Lichens, and to the tribe Pseudo-lichens of the arrangement of Acharius.

VERRUCOSE (Lat. *verruca*, 'a wart'), in Botany and Zoology, a term employed to describe a surface which presents numerous wart-like prominences. In botany, the term *verruca* is applied to the sessile elevations of a glandular nature which occur on the surface of different organs.

VERSAILLES, capital of the department of Seine-et-Oise, in France, 11 miles by railway S.W. from Paris, is situated in 48° 48′ N. lat., 2° 7′ E. long., and has 49,899 inhabitants. It was a mere village in the time of Louis XIII., who built a hunting-seat here on the site of an ancient priory; Louis XIV., by devoting enormous sums to its embellishment, converted it into the most magnificent palace in Europe. Under this prince (from 1672) and Louis XV. and XVI. it was the ordinary residence of the court; and the village of Versailles grew into a handsome city. It is now divided into two nearly equal parts by a noble avenue, nearly half a mile long, running east and west, planted with four rows of elms, forming three alleys, with a total breadth of at least 288 feet. The centre alley, which is paved, forms part of the high road to Paris, and enters the town on the east, affording the traveller a view of the palace, which faces the avenue at its western extremity. Versailles itself is thus divided into Old Versailles, on the south side, and the Quarter of Notre Dame on the north; the two parts, however, are equally modern, and consist of straight broad streets crossing each other at right angles. The mansions, &c., occupy a great extent of space as compared with the population, and this is consequently one of the best-ventilated cities in Europe.

Besides the avenue of Paris, two others, that of St. Cloud on the right and of Sceaux on the left, converge on the Place d'Armes, which is at the western end of the Avenue de Paris, immediately in front of the palace. Both of these, as well as several boulevards, are also planted with fine elms, and lined with pleasant residences. There are many open spaces, of which the Place d'Armes is the largest, and the Place Hoche, which is adorned with a fine bronze statue of General Hoche, is the handsomest. There are two market-places, one in Old and one in New Versailles; and the city is adorned with several handsome fountains and palatial residences. It was formerly considered one of the handsomest towns in Europe, the houses being almost all elegant, and of a uniform height.

The middle of the town front of the palace is formed by the building of Louis XIII. It has a centre and two wings advancing at right angles so as to inclose three sides of a court, which is open on its fourth or east side towards the Place d'Armes. The central and principal part of the palace of Louis XIV. forms three sides of a quadrangle, sufficiently large to envelop in its inclosure the older palace of Louis XIII., so that the two buildings stand back to back, that of Louis XIII. fronting the town, and that of Louis XIV. the garden. The latter is adorned with Ionic columns, eighty-six in number, arranged in fifteen colonnades of four, six, or eight, each colonnade supporting a cornice crowned with as many statues as there are pillars. The galleries and saloons are of great size and splendour, and all that money, labour, skill, and the highest art could accomplish, have been employed in their ornamentation. The palace was built from the designs of J. H. Mansard and Le Brun. The frontage to the garden, which it faces on three sides, is 1900 feet. The garden or little park, immediately before the west side of the edifice, is an irregular polygon about 3 miles long from the palace to its western extremity, and about 2 miles broad. It is included in the limits of the great park, which is estimated to be from 20 to 25 miles in circuit. The garden was laid out by Le Notre, in terraces, parterres, and alleys, adorned with a profusion of statues, vases, and other sculptures; with a canal in the shape of a cross, and other pieces of water of the same formal character, and a number of magnificent fountains, which are supplied with water from the Seine. These play on alternate Sundays during summer, and on certain fête days, and always attract a multitude of spectators from Paris. The orangery is remarkable for the number and beauty of the trees which it contains.

The interior of the palace was magnificently fitted up and decorated by Louis XIV. After the first Revolution the building was almost totally neglected; but by the munificence of Louis Philippe, who spent altogether 900,000*l.* on the building and decorations, it was thoroughly repaired, and converted into a national historical museum of sculpture and painting, which was opened to the public on the occasion of the marriage of the duke of Orleans, June 10, 1837. This museum consists of a series of paintings and statues arranged in chronological order, in immense galleries, and it includes trophies of all the most important French victories, from Clovis downwards. The pictures illustrate the history of the country from the Crusades to the Italian war of 1859, and comprise many fine portraits of French heroes, &c. Adjacent to the north wing of the building on the town side, are the chapel and the opera-house; the former remarkable for its architectural beauty, its decorations, and its many historical recollections.

The *Cour d'Honneur*, one of the principal approaches to the palace, contains a large equestrian figure of Louis XIV., and statues of Richelieu, Condé, Turenne, Bayard, and other celebrated Frenchmen. In the park of Versailles are the two royal country-houses of the Grand Trianon and the Petit Trianon, with their respective gardens. The Grand Trianon was built by Louis XIV.; the Petit Trianon by Louis XV. The 'English garden,' which is the great attraction of the Petit Trianon, was formed by the orders of Marie Antoinette. In the Place d'Armes, opposite to the town front of the palace, are two ranges of stables of great extent; and close by is the Grand Commun, a heavy building, which had a thousand sleeping-rooms, and is now a military hospital. To the south-east and south are the kitchen-garden and a very large piece of water called 'La Pièce des Suisses.' The former mansions of the grand-master of the king's household, and of the chief huntsman, are now converted respectively into the town-hall and the court-house; the former Garde-Meuble is the prefect's office. The Tennis Court, termed the *Jeu de Paume*, famous for the oath taken in it by the National Assembly, June 20, 1789, was for many years the studio of Horace Vernet, who executed here all those of his paintings that adorn the palace collection. Since the Revolution of 1848 it has become national property. The churches of Versailles include the cathedral of St. Louis, the church of Notre-Dame, a beautiful chapel attached to the college, and a parish church in the suburb of Montreuil. The general hospital is one of the finest in France. The city has also a national college, normal, ecclesiastical, and other schools, a public library of 60,000 volumes, many

scientific and literary societies, civil and commercial tribunals, chambers of agriculture and of commerce, a horticultural society, mineralogical and geological collection, theatre, several barracks, prison, &c.

Versailles is stated to be more a city of pleasure than of industry, with few manufactures and a little trade. At the present day many foreigners reside there, attracted to it by the salubrity of the climate, the fine promenades, and the economy of living as compared with Paris. The town has a good corn market, some breweries and tanyards, and a number of nursery grounds. Clocks and watches, jewellery, firearms, hats, hosiery, wax candles, earthenware, and glass, are made, but only in small quantities. Two lines of railway afford easy communication with Paris.

Versailles gives title to a bishop, whose diocese is the department of Seine-et-Oise. The city was the birthplace of Philip V. of Spain; Louis XV., XVI., and XVIII., and Charles X. of France; General Hoche, the Abbé de l'Epée, and Ducis. The first superior of the priory was *Hugo de Versaliis*, who lived in the eleventh century.

Many important treaties have been signed in the palace of Versailles—one of them being that by which England recognized the independence of the United States of North America in 1783.

VERSCHAFFELTIA, a genus of *Palmeæ*, named after a Belgian florist, one Ambrose Verschaffelt. The species are handsome, and belong to the island of Seychelles and other tropical regions. The stem is simple and erect, clothed with spreading acicular spines of a black colour; the fronds are broad and entire; the fruit globose and drupaceous.

VERSE (Lat. *verto*, 'I turn'), is a variety, or group, or portion of metres, written in one line, and as being rhythmically accented or measured, opposed to *prose*. A group of lines, though frequently styled a verse, is really a stanza. The term is sometimes used generally to signify metrical composition. Thus we speak of Pope or Tennyson as 'a master of verse.' The division of the books of the Bible into verses was applied in the earliest MSS. to those parts of the text, as the Psalms and Solomon's Song, which were written in poetical language; but was carried through the other Biblical books by Henry Stephens, the great French printer. It was adopted into the English Bible printed at Geneva in 1562, and into the authorized version in 1611.

VERSION (Lat. *versio*, 'a turning,' from *verto*), a term now confined to the various translations of the Scriptures into modern languages. The ancient versions were the Æthiopic, Arabic, Armenian, Chaldee (or Targum), Egyptian, Greek (or Septuagint), Latin (or Vulgate), Samaritan (or Pentateuch), and Syriac. The first English translation was made by Wycliffe, 'the morning-star of the Reformation,' in 1380; another was effected by Tyndale and Miles Coverdale, in 1525–35. The Bishops' Bible appeared in 1568; the authorized version was commenced in 1604, by direction of James I., who chose fifty-four prelates, clergymen, and scholars for the purpose. It was first published in 1611, and still holds its ground, though it is generally admitted by our biblical critics to stand in urgent need of careful revision. Its language is deservedly praised as 'a well of English undefiled.'

VERST, or WERST, a Russian measure of length containing 3500 feet; about two-thirds of an English mile.

VERTEBRA. [SKELETON.]

VERTEBRATA, the principal grand division of the animal kingdom, including all which present us with a true skull inclosing a brain, and a vertebral column defending a spinal chord. [ANIMAL; MAMMALIA; BIRDS; REPTILES; FISH.] Blood, red; heart, muscular; limbs, never exceeding four, often wanting; sexes, separate.

VERTEX, a name given to any remarkable or principal point, particularly when that point is considered as the top or summit of a figure. Thus we have the three vertices of a triangle, the vertex of a cone or pyramid, &c.

VERTICAL. The zenith being considered as a vertex, which in fact it is, when the word vertex means summit, a vertical plane is one which passes through the line drawn from the spectator to his zenith; a vertical plane therefore merely means one which is perpendicular to the horizon, and a vertical line has the same meaning.

VERTICIL (Lat. *verticillus*, 'a whorl'), in Botany, a ring of any kind of organs, arranged round a stem upon the same plane. When the disposition is irregular, and cannot be described by a line drawn horizontally round the stem, but some parts are either above or below it, the whorl is said to be broken.

VE'RTIGO, or Giddiness, in man, is a peculiar sensation, depending probably on some disturbance of the circulation in the brain.

As a sign of disease, vertigo by itself indicates very little. No judgment can be formed from it, except by taking it in connection with the other characters of the affection of which it is a part, and these will generally be sufficiently indicative. Its most common cause is some disturbance of the digestive organs, and it may be safely treated in that view except in those who are prone to apoplexy or other cerebral disease, when it must be always regarded with fear, and requires extreme caution.

Vertigo in sheep and cattle is caused by the presence of a well-known *Hydatid*, or bladder-like internal parasite, in the brain of the animal. The brain-hydatid of the sheep (*Cœnurus cerebralis*) varies in size from that of a pea to a pigeon's egg. It is a simple bladder-like vesicle, containing a clear, yellow, albuminous secretion, and having on its outward surface a number of retractile elevations, or *papillæ*, which are found to be the heads of tape worms connected by a stalk to the common vesicle. These worms are known as *scolices*, or embryo tape-worms.

VERTOT, RENÉ AUBERT DE, the second son of a poor Norman gentlemen, was born on November 25, 1655. He studied in the Jesuits' college at Rouen and joined the order of the Capuchins in the convent at Argentan. But the rigour of the order undermining a constitution naturally delicate, he was persuaded to join a less ascetic fraternity; and the pope's dispensation having been obtained, entered the Premonstrant Abbey at Valery. He soon afterwards obtained the cure of Croissy-la-Carene, near Marly, where he devoted himself to the discharge of his spiritual duties and literary pursuits.

His first publication was his 'Histoire de la Conjuration de Portugal,' published in 1689. He was then advanced, first to a cure in the Pays de Caux, and next to a richer living near Rouen. His second work was his 'Histoire des Révolutions de Suède.' When, in 1701, the king re-organized the Academy of Inscriptions and Belles-Lettres, Vertot was nominated Académicien Associé. In 1705 he was appointed Académicien Pensionnaire. From this date his contributions to the Annals and Memoirs of the Academy became frequent. These occupations did not divert him from his favourite topic —the Revolutions of the Roman Republic. This history, which appeared in 1719, was still more favourably

received than its predecessors. His reputation induced the Order of Malta to invite him to become its historian. He compiled and published, in 1726, his 'Histoire des Chevaliers Hospitaliers de St. Jean de Jerusalem.' Vertot died in the Palais Royal, Paris, June 15, 1735.

VERTUE, GEORGE, was born in London, in 1684, of parents more honest than opulent. At about the age of thirteen he was placed with a Frenchman, who was the principal engraver of arms in London at that time; and he afterwards spent two years at home, which he devoted to the study of drawing. He then engaged himself with the engraver Michael Vandergucht, and in 1709 set up for himself. During the reign of Anne he was chiefly employed upon portraits after Kneller, and others. He commenced early in the reign of George I. to make his researches for his 'History of the Arts in England.' Heneage Finch, earl of Winchelsea, who was president of the Society of Antiquities in 1717, appointed Vertue, who was a member, to be its engraver; and he executed nearly all the prints which were published by that society during the remainder of his life. He was also very extensively employed by rich and noble patrons. In 1730 he published a set of twelve English Poets, and afterwards engraved some of the portraits for the translation of Rapin; but was superseded by Houbraken, who engraved better, but was less scrupulous as to the genuineness of his originals. He died July 24, 1756.

Walpole's 'Anecdotes of Painting in England' was written entirely from manuscripts which he bought of Vertue's widow. Vertue commenced his compilations in 1713, and they amounted in the whole to nearly forty volumes, large and small. Walpole has given a complete list of his prints in his 'Catalogue of Engravers.'

VERUS, LU'CIUS, a Roman emperor, who reigned as the colleague of Marcus Aurelius, from 161 to 169. Verus had been educated by the most distinguished grammarians and philosophers of the time, but had no taste for intellectual occupations. So long as he was under the direct influence of M. Aurelius, his vicious character did not fully disclose itself. In 162 he took the field against the Parthians, but instead of conducting the war in person, he left it to his generals, who gained victories, while the emperor revelled in debauchery, with which he became familiar in the towns of Asia, especially at Antioch. In 164 he went to Ephesus, where he celebrated his marriage with Lucilla, the daughter of his adoptive father (Antoninus Pius), or, according to others, of his adoptive brother. After the close of the war he returned to Rome, accompanied by hosts of actors, freedmen, and low persons, who ministered to his vulgar pleasures, and in 166 he and Marcus Aurelius solemnized a triumph over the Parthians. Soon after this, Rome was visited by a fearful pestilence, and at the same time the Marcomanni and Quadi invaded the empire from the north. Both the emperors, at the head of their armies, marched to Aquileia. Verus took scarcely any part in the war, but as usual gave himself up to his pleasures. When hostilities had ceased, the two emperors returned to Rome. On his way thither L. Verus was seized with a fit of apoplexy at Altinum, in the neighbourhood of Venice, where he died, 169, in the forty-second year of his age. There is a marble bust of Verus in the British Museum.

VERVAIN. [VERBENA.]

VESICATORY. [BLISTER.]

VESPASIA'NUS, TITUS FLA'VIUS, was born near Reáte, in the Sabine country, on the 17th of November, A.D. 9. He served in Thrace as military tribune, and having held the magistracies of ædile and quæstor, in the latter of which he had for his province Crete and Cyrenaica, he became prætor in the reign of Caligula, A.D. 39. About this time he married Flavia Domitilla, by whom he had two sons, Titus and Domitianus, who were successively emperors.

In the reign of Claudius he held a command in Germany (A.D. 41-42). He afterwards served with distinction in Britain under Aulus Plautius (A.D. 43), and under Claudius himself. He was consul suffectus in A.D. 51. In the reign of Nero he governed Africa as proconsul, but instead of enriching himself, he much impaired his fortune. In A.D. 67 he accompanied Nero in his tour through Greece; but he incurred disgrace, it is said, by falling asleep or leaving the room during one of the emperor's poetical exhibitions. However, when the Jews revolted, Nero gave him the command in the Jewish war with an army of three legions. In less than two years he had conquered the whole of Judæa except Jerusalem, when he was persuaded by his son Titus, and by Mucianus the proconsul of Syria, to assert his claim to the imperial throne, which had been already marked as his by repeated omens. He was proclaimed emperor at Alexandria, on the 1st of July, A.D. 69, and his cause was espoused by the legions of Judæa and Syria, by three legions in Mœsia, and by two in Pannonia. The troops of Mœsia and Pannonia were brought over by Antonius Primus, who marched into Italy. Vitellius was betrayed by Cæcina, the consul suffectus, and his army, though superior in numbers to that of Antonius, was routed by the latter in a battle between Bedriacum and Cremona. Antonius marched to Rome, Vitellius was put to death, and the authority of Vespasian established.

The emperor now proceeded to Rome, leaving the reduction of Jerusalem to his son Titus. He arrived in the city at the end of the summer of the year 70 A.D., the Senate having in the meantime appointed him, with his son Titus, to the consulship, and conferred upon him all the accustomed imperial honours. He restored the privileges of the Senate, reformed the courts of justice, restored discipline to the army, and order to the finances. He repaired the devastations which Rome had suffered in the recent civil wars, and adorned the city with many new buildings. He began or completed the restoration of the Capitol, the temples of Peace and of Claudius, and the amphitheatre called the Colosseum.

Temperate in his own habits, he exerted himself to restrain luxury in his subjects. He was affable to his friends, and even suffered severe strictures on his conduct to pass unpunished. He was fond of money, but what he exacted from his subjects he spent on public works, not on his own pleasures. He was a liberal patron of literature and art.

The reign of Vespasian was signalized by great military successes, of which the most important were the victories of Petilius Cerealis over the Tréviri (A.D. 70), those of Agricola in Britain, and the conquest of Jerusalem. [TITUS.] In A.D. 72 the kingdom of Commagéne was taken from Antiochus and added to the Roman empire.

Vespasian died of a fever, on the 23rd of June, A.D. 79, in the seventieth year of his age and the tenth of his reign.

VESPERS (Gr. Ἑσπέρα, *Hesperus*, or *Vesper*, 'the evening star'), one of the seven canonical hours in the Roman Catholic Church, called also, in ancient times, *Lucernarium*, from *lucerna*, 'a lamp.' It is a service of great antiquity, and continues to be sung as

one of the ordinary services of parish churches, following 'nones' and preceding 'compline;' that is, in modern times, at about two or three in the afternoon. It consists of five psalms and antiphons, a lesson, a hymn with versicle and response, the Magnificat, and a collect or prayer. The evening service of the Anglican Church partly corresponds to vespers, and partly to compline. The massacre of the French in Messina and Palermo, historically famous as the *Sicilian Vespers*, was so called because it commenced at the ringing of the vesper bell at Palermo, Easter Monday, March 30, 1282.

VESPERTILIONIDÆ (*Bats*). [CHEIROPTERA.]

VE'SPIDÆ (*Wasps*). The insects of the order *Hymenoptera*, composing the genus *Vespa* of Linnæus, of which the common Wasp and the Hornet are familiar examples, were formed into a family by Latreille, under the name of *Diploptera*, afterwards changed into *Diplopterygia* by Kirby. They form the third and last division of the first subsection (*Prædones*) of the second section (*Aculeata*) of *Hymenoptera*, in Westwood's revision of Latreille's arrangement. The wings of all the insects of the family have a similar neuration, their eyes are lunate, and there are glands at the extremity of the labrum. The forewings have one marginal and three perfect submarginal cells, with an incomplete terminal submarginal cell. [WASP.]

VESPUCCI, AMERI'GO, was born March 9, 1451, at Florence. Mercantile avocations led him to Spain, and he seems to have been a factor in the wealthy Florentine house of Juanoto Bernardi, at Seville, in 1486. On the death of Juanoto Bernardi in 1495, he was placed at the head of the factory.

In the narrative attributed to Vespucci, published at St. Dié, in Lorraine, in 1507, and republished at the same place in 1509, he is said to have made four voyages: two under the auspices of the king of Castile, in 1497 and 1499; two by command of the king of Portugal, in 1501 and 1503. The first has been alleged to be apocryphal by some warm supporters of the claims of Columbus to be the original discoverer of the mainland of America, as well as of the islands, and they have not scrupled to attribute to Vespucci a fraudulent attempt to arrogate to himself the honour due to the Genoese. Humboldt, in the fourth volume of his 'Histoire de la Géographie du Nouveau Continent,' has successfully vindicated Vespucci from this imputation, and proved that there is every reason to believe that the voyage really was made, though at a later date than appears in the printed book. Vespucci seems to have served, in all the expeditions he was engaged in, in the capacity of astronomer. In 1507 he was intrusted with the victualling and furnishing of a royal fleet fitted out by Spain in that year. On March 22, 1508, he obtained the appointment of piloto-mayor, which he retained till his death, at Seville, February 22, 1512.

VESTA (Ἑστία or Ἰστίη), one of the divinities, common both in name and mode of worship to the Greeks and Romans. According to Hesiod, she was the first-born daughter of Cronos and Rhea, and sister of Zeus; the Romans made her the daughter of Saturn and Ops. She was a maiden divinity,

Vesta was the goddess of the hearth, and as the hearth was the centre of the family, where the members met, conversed, and took their meals, Vesta was regarded as the goddess of domestic union. Strangers and friends were hospitably received at the hearth; suppliants sought safety and protection there. The fire on the domestic hearth was also regarded as the symbol of Vesta herself. Each political community, city, or state, had its public hearth, or altar of Vesta, on which a perpetual fire was kept burning. When a state sent out colonists, they took from the hearth of the metropolis (the Greek name for the parent city) the fire which was to blaze on the public hearth of the colony. Larger communities than a mere town or city had likewise their public hearth and centre of union. Thus the common hearth of the Greeks was at Delphi, and that of the Latins at Lanuvium.

In Greece Vesta had few temples, because every house and every Prytaneum was regarded as her sanctuary. But at Hermione in Argolis she had a temple, though, like her temple at Rome, it contained no image of the goddess. The temple of Vesta at Rome was round, and stood in the Forum. It was open during the day. The temple contained the altar of the goddess, on which burned the eternal fire. [VESTAL.]

VESTA. [PLANETS, SMALL.]

VESTAL (Virgo vestális), a priestess of Vesta. The number of these priestesses, according to the regulations of King Numa, was four, two for each of the ancient tribes. Servius Tullius, or, according to others, Tarquinius Priscus, added two more, to represent the third tribe, or Lúceres. In the earliest times they were chosen by the kings, but afterwards by the Pontifex Maximus, who drew by lot one out of twenty select virgins in the assembly. Parents had no right to oppose their daughter being devoted to the service of the goddess, except in three cases: first, if one of her sisters was already a vestal; secondly, if the parents had no more than three children; and, thirdly, if the father held one of certain high priestly offices. There were also certain conditions of qualifications for the office of a vestal. A vestal must not be younger than six nor older than ten years, when chosen. From the moment that a vestal virgin was chosen and taken to the atrium of Vesta, she was emancipated from her father's power. A vestal virgin was obliged to serve the goddess for thirty years, at the end of which time they might unconsecrate (*exaugurare*) themselves, and marry. These virgin priests enjoyed at Rome the highest distinctions. They had an official residence in the Via Sacra, and an annual allowance.

Their duties were to keep the fire burning on the altar of Vesta, and regulate all things connected with the worship of the goddess. They had also to prepare the sacrifices on certain occasions. If the sacred fire was ever extinguished through the carelessness of a vestal, she was scourged by the Pontifex Maximus. They were bound to maintain their chastity, and incontinence was punished with death. The guilty vestal was placed alone in a subterraneous vault, and the tomb closed and covered over with earth.

VESTMENTS. At the institution of the Jewish priesthood, very minute instructions were given as to the manner in which they were to be attired during the performance of their religious duties. See, *e.g.*, Ex. xxviii., &c. The custom of the priests dressing differently to the people during worship was not, however, confined to the Jews, but was practised in nearly every religion of antiquity, and is continued in those of them which have existed to the present time. It is exceedingly doubtful whether the system was adopted in any way by the immediate disciples of Christ and the earliest teachers of Christianity: it is almost certain it was not, for it is believed on excellent authority that many of the garments which have been retained and are now worn exclusively by priests were originally merely parts of the ordinary dress of the people: indeed, the derivation of

the very names of many of these vestments favours this supposition. As early, at least, as the fifth century, however, the clergy had assumed a distinctive dress during the celebration of divine service. The vestments to be worn in the Church of England under the existing canons (James I., 1603), by 'ministers saying public prayers or ministering the sacraments or other rites of the Church,' are 'a decent and comely surplice with sleeves;' and for graduates, 'such hoods as by the orders of the universities are agreeable to their degrees,' with permission to 'such ministers as are not graduated to wear upon their surplices, instead of hoods, some decent tippet of black, so it be not of silk.' (*Vide* 58th Canon.) This canon is in accordance with the advertisements of Queen Elizabeth, and has been the governing rule in the church from the time of the Reformation, although by the introduction of the rubric immediately preceding the order for Morning Prayer, on the revision of 1662, a foundation was laid for the resuscitation of the Romish vestments in use prior to the second year of Edward VI., and of which the ritualists have availed themselves during the last few years. The rubric of the first Prayer Book of Edward VI. prescribed the use of the surplice, the hood, the rochette, the cope, the tunicle, the alb, and pastoral staff. Besides these, the ritualistic clergy have revived various other vestments and ornaments in use in the church prior to the Reformation; but by the second Prayer Book of Edward VI., those permitted in the first are, with the exception of the bishop's rochette and priest's surplice, interdicted in these words: 'And here it is to be noted that the minister at the time of the communion, and at all other times of his ministration, shall use neither alb, vestment, or cope; but being archbishop or bishop, he shall have and wear a rochette, and being a priest or deacon, shall have and wear a surplice only.' The whole of the reforms of Edward VI. were swept away by a repealing Act of Queen Mary, but this Act was again repealed by 1 Eliz. c. 2, which revived the second Prayer Book of Edward VI., except as to the ornaments of the church and clergy, but reserving power to the queen to take order thereon, which she did, as already stated, by advertisement, subsequently confirmed by the Canons of 1603. But the introduction into the Prayer Book, incorporated in and made part of the Act of 13 & 14 Car. II. c. 4 (1662), of the rubric restoring the ornaments of the church and the ministers thereof which were in use in the second year of Edward VI., although allowed to sleep for more than 200 years, has at length been seized upon to warrant the ritualistic practices which at present disturb the peace of the established church.

1. The *surplice*, the name of which comes from the Latin *superpellicium*, was so called because anciently this garment was put *super tunicas pellicas de pellibus mortuorum animalium factas*, 'upon leathern coats, made of the hides of dead beasts;' symbolically to represent that the offence of our first parents, which brought us under a necessity of wearing garments of skin, was now hid and covered by the grace of Christ, and that therefore we are clothed with the emblem of innocence. The antiquity of it in the Eastern Church appears from Gregory Nazianzen, who advises the priests to purity, because 'a little spot is soon seen in a white garment.' And it is very probable it was used in the Western Church in the time of St. Cyprian. The colour of the surplice is white, as representing the innocence and righteousness wherewith God's ministers should be clothed.

2. The *hood*, which, next to the surplice, is of most frequent use in the celebration of divine service, is the habit denoting the degree which the person officiating has taken in the university. Of its two Latin names, *caputium* and *cucullus*, the latter seems the proper and most ancient; for the *cucullus* was a habit among the ancient Romans, being a coarse covering for the head, broad at one end for the head to go in, and then lessening gradually till it ended in a point. From the Romans the use of it was taken up by the old monks and ascetics, who, in church, made choice of this habit as suitable to their professed strict reserve; for, if drawn over their faces it at once precluded their gazing or being stared at. It subsequently came to be used by several members of cathedral churches and colleges, though these were not allowed the same kind of hood as the monks. From these the universities took the use of it, to denote the difference of degrees among their members, varying the material, colour, and fashion of it according to the degree of the wearer. The rubric and canons enjoin that every minister who is a graduate shall wear his proper hood during the time of divine service, but forbid all that are not graduates to wear it under pain of suspension.

3. The *rochette* is the third ministerial vestment enjoined by the rubric, and is a linen habit peculiar to the bishop, and worn under what is called the chimere. Since the Reformation the bishops have not worn their rochettes at any place out of the church, except in the house of Parliament, and there always with the chimere, or upper robe, to which the lawn sleeves are generally sewed.

4. The *cope* was at first a common habit, being a coat without sleeves, but was afterwards used as a church vestment, only made very rich by embroidery, &c. It was to be worn only by the bishop when engaged in any public ministration, and by the priest who should consecrate the elements. It is said to have been taken up in memory of the mock robe which was put upon the Saviour.

5. The *tunicle* was to be worn by priests and deacons that assist the minister in the distribution of the elements, instead of copes. Durand describes the tunicle as having been a silk sky-coloured coat made in the shape of a cope.

6. The pastoral staff is another thing expressly enjoined by the above-cited rubric. It is peculiar to the bishop alone, but ordered to be used by him as an ensign of his office, at all public administrations. It was made in the shape of a shepherd's crook, and was given to the bishop at his consecration, to denote that he was then constituted a shepherd over the flock of Christ.

Besides the above vestments, the rubric of the first prayer-book of Edward VI. prescribed the use of several, most, in fact, of the ministerial ornaments which were the special peculiarity of the Church of Rome; and, strange to say, notwithstanding all the anti-Romish feeling of subsequent times, this rubric has never been repealed. Within the last few years a movement has been made by a large party in the church for the revival of these obsolete costumes, more especially those used in the celebration of the sacrament of the Lord's Supper; and whether people like it or not, the 'High Church,' or 'Ritualistic' party find that, owing to the obscurity of the law, they can do very much as they like in the use of vestments, which were long thought to be the exclusive distinction of the Roman Catholic Church.

The principal of these revived vestments used by the priest in celebrating the 'divine office' are the amice, alb and girdle, stole, maniple, and chasuble. To each of these a twofold symbolical character attaches, they being emblematic of particular virtues and graces, and

at the same time having reference to something borne by the Saviour at the time of his passion. To bring these symbolical meanings home to the mind of the priest himself, he is directed by the church to use certain prayers when vesting, which are intended to serve as a guide to the significance of each portion of the 'Eucharistic vestments.'

The priest first puts on the *amice*, a piece of white linen, which, put first upon and over the head, rests on and covers the shoulders. The name is derived from *amicire*, and its use dates from the eighth century. The idea that the priest should go to the altar armed against the assaults of evil spirits, and, according to St. Paul, take the 'helmet of salvation,' is expressed in the vesting prayer: 'Place, O Lord, the helmet of salvation upon my head, to repel the assaults of the devil.' In regard of the passion of our Lord, the amice represents the veil with which he was blindfolded, or sometimes the crown of thorns.

The first vestment enveloping the person is the *alb*, a robe in use among persons of condition in the Roman empire. Its use in the church is of very ancient date, and it appears from time immemorial to have been a kind of linen garment, made to fit close to the body, like a cassock. The albs were formerly embroidered with various colours, and adorned with fringes, but the rubric now enjoins only *white alb plain*. The prayer at putting on the alb is, 'Cleanse me, O Lord, and purify my heart, that, washed in the blood of the Lamb, I may attain everlasting joy.' The alb further represents the white robe in which Herod 'arrayed' our Lord, and sent him back to Pilate. It is generally tied round the middle with a girdle, or sash, which is supposed to symbolize the cord by which the Saviour was bound to the pillar of scourging, or that with which he was led from Gethsemane, after they had bound him.

The *stole*, of old the *orarium*, and of fine linen, is regarded as a vestment of dignity, and the priest is desired in vesting to beseech of God 'the robe of immortality, which I lost by the sin of my first parents.' The stole has thus become an emblem of authority, and is worn by a bishop, hanging straight down in front; by the priest, under the vestments, crossed on the breast; and by the deacon upon one shoulder only; the subdeacon does not wear it at all. The stole being worn like a yoke, on the shoulders, is taken to represent the humility and obedience of our Lord for the expiation of sin.

The *maniple* was originally simply a handkerchief, or *sudarium*. It is suggestive of labour and sorrow, and the priest prays as he takes it up, 'Grant me, O Lord, to bear the life-burden of grief and sorrow, that I may with gladness receive the reward of my labour.' Some take the maniple to represent the chains which bound our Lord when he was scourged; others, to signify by its weight on the arm, the weight of our sins which were borne by the Saviour.

The *chasuble*, which is the principal symbolical Eucharistic vestment (from *casula*, 'a little house'), and originally of very ample size, was a circular vestment, open only at the top, to pass over the head of the wearer, and representing the yoke and service of Christ. It admits of, and receives—according to the means of the clergy, or the 'piety of the faithful'—almost unlimited ornament. The Gothic form ornamented with the Y cross is the form generally restored amongst ritualists. The vesting prayer points to the symbolical meaning, 'O Lord, who hast said, My yoke is easy and my burden is light, grant that I may so bear it as to attain thy grace.' The chasuble represents the 'purple garment' put on the person of our Lord by the soldiers of Pilate; or, as some take it, the 'seamless coat.' The Gothic form, with the orphreys covering the seams, seems to favour the latter symbolism.

The priest, thus completely vested, is supposed to represent the person of Christ, and approaches the altar, according to the ritualist's idea, as our Saviour ascended Calvary, and, as his vicegerent and representative, to offer sacrifice for the people.

The surplice, stole or scarf (in accordance with canons and long-established practice), and hood are almost the only vestments worn by the Protestant, or Evangelical clergy, with the exception of the black silk gown in which they preach, the origin of which is rather uncertain, not being enjoined by the rubric. Among dissenters nearly the only body using a vestment is the Independent, or Congregational, who use the black gown. It seems it was the custom, on their first secession from the Church, for the ministers to send their sons to a college at Geneva, where a gown was conferred upon them varying in quality and proportion according to the degree taken, and its use among dissenters is supposed to have originated thus; the long black silk gown having indicated the highest honours achieved. Probably its use in the Church of England arose from a similar custom at English universities.

VESTRY is that part of a parish church where the ecclesiastical vestments are kept; and inasmuch as meetings of parishioners have been usually held in this part of the church for parochial purposes, such meetings, duly convened, have acquired the name of vestries. Even where a building remote from the church has been erected for parochial meetings, it is usually called the *vestry-room*. When the meeting is held in the church, or even in a building within the precincts of the churchyard, the ecclesiastical courts claim jurisdiction over the conduct of the parishioners.

By the common law all rated inhabitants of a parish have a right, either periodically or when specially convened, to meet in vestry on the affairs of the parish, and to vote the necessary pecuniary rates. But this common-law right has been modified in many ways:—

1. By custom, which has vested the government of some parishes in a select and usually a self-elected body of persons. The principal Act for the regulating of these vestries is the 58 Geo. III. c. 69.

2. Section 20 of the Act 10 Anne, c. 11, gives to the commissioners appointed by that Act (for the purpose of erecting fifty new churches in London and its neighbourhood) power to appoint, under their seals, with the consent of the ordinary, 'a convenient number of sufficient inhabitants, in each parish created under the Act, to form a select vestry of such parish.' It vests in the majority of such select vestry the power to supply vacancies, and gives them all the powers of other vestries. The 59 Geo. III. c. 134, another church-building Act passed to explain and amend the Act of the previous session, gives a similar power (s. 30) to the commissioners under those two Acts to appoint, with the like consent, a select vestry; and the 10th section of the Act 3 Geo. IV. c. 72, confines the powers of the vestryman to his own district with respect to ecclesiastical matters, and provides that any deficiency in the select vestry shall be supplied as vacancies have heretofore been filled up in the vestries of the particular parish. Local Acts have also created vestries.

3. The 59 Geo. III. c. 12 (Sturges Bourne's Act), enables general vestries to appoint special vestries, consisting of not more than twenty parishioners or fewer

than five, to superintend the relief of the poor, the overseers of the poor being placed under their authority.

4. A fourth kind of vestry is created by 1 and 2 Will. IV. c. 60 (Sir John Hobhouse's Act). The adoption of this Act is left to the discretion of each particular parish; but rural parishes of less than 800 rated householders are excluded from its operation.

It is the duty of vestries to provide funds for the maintenance of the edifice of the church and the due administration of public worship; to elect churchwardens; to present for appointment fit persons as overseers of the poor; to administer such estates and other property as belong to the parish; and in some cases, under local Acts, to superintend the paving and lighting of the parish, and to levy rates for those purposes.

The remedy for neglect of duty by a vestry is a mandamus from the Court of Queen's Bench, directed to the officer whose duty it would be to perform the particular act, or in some cases by an ordinary process against him, or by a process against the churchwardens out of the ecclesiastical courts. By the Act 13 & 14 Vict. cap. 57, vestries are not to be held in churches, and the same Act regulates the appointment of vestry-clerks. The 16 & 17 Vict. c. 65, contained some slight amendments.

The corresponding authority in Scotland is the Kirk Session, composed of the ministers and elders of each parish.

VESU'VIUS (written also by the Roman poets *Vesévus* and *Vesvius*), a mountain about 6 miles E. from the city of Naples, celebrated for many centuries as one of the principal volcanoes and indeed the only active one of any consequence on the continent of Europe. Its height above the sea is variable, according to the condition in which eruptions leave the crater. By the violent eruptions of October, 1822, the top was left as a vast elliptical gulf or chasm 3 miles in circumference, and perhaps 2000 feet in depth. More than 800 feet of the summit of the ancient cone were carried away by the explosions, and the height of the mountain was thus reduced from 4000 to 3200 feet.

Mount Vesuvius rises out of the fertile and luxuriant plain of Campania; its lower part is a sloping plain covered with stones and scoriæ, 3 miles in length, and rising to 2000 feet, above which a cone of black stones extends to the summit. Around the mountain a larger number of simple minerals have been discovered than on any other area of similar dimensions; and the vegetable products on its flanks comprise euphorbias and many other plants not found elsewhere in Italy. The vines which produce the famous wine called *Lacryma Christi* are raised on its sides. There is a railway to the village of Portici, from which the ascent of Vesuvius is made. Half-way up, at the limit of the cultivated ground, is the Hermitage, a house of refreshments, reached by mules and donkeys.

The history of the eruptions of Vesuvius has been traced by several writers, especially by the late Dr. Daubeny, in his 'Treatise on Volcanoes,' and Sir Charles Lyell, in his 'Principles of Geology.' It does not appear that any record exists of an actual eruption of Vesuvius prior to the Christian era. In the month of August, A.D. 79, occurred the first and perhaps the greatest of all the recorded outbreaks, described in the letter of Pliny the Younger to Tacitus, which records the death of Pliny the naturalist. The cities of Stabiæ, Pompeii, and Herculaneum were overwhelmed by showers of cinders and loose fragments, no lava having been ejected on this occasion. Other eruptions succeeded in 203, 472, 512, 685, 993, and 1036, which last is said to have been the first attended by an ejection of lava. Eruptions were renewed in 1049, 1138, 1306, 1500, 1631, 1660, 1682, 1694, and 1698, from which time to the present they have occurred very frequently, so as seldom to leave any interval of rest exceeding ten years. The most celebrated during the last 100 years have occurred in 1779, 1794, 1822, 1834, 1850, 1855, 1858, 1861, 1865, 1867, and 1868. Sometimes this mountain has flamed twice within a few months. The eruption of 1737 gave forth lava currents which passed through Torre del Greco into the sea, the solid contents being estimated at 33,587,058 cubic feet. In 1794 the lava followed the same course, and amounted to 46,098,766 cubic feet. [HERCULANEUM; POMPEII.]

VETCHES. [TARES; VICIEÆ.]

VET'ERANS, a term applied to the Royal Veteran battalions, who take precedence, after the foot-guards, of all the infantry regiments of the line. But the officers are not entitled to full retired pay, like those of the regular regiments.

VETO, in Politics, the power of one branch of the legislature to reject or negative the propositions or resolutions of another branch. In the United Kingdom that power is enjoyed by the sovereign, who can veto any bill passed by the two Houses of Parliament. It is, however, only employed in great emergencies, and the last occasion on which it was exercised was in 1707, when Queen Anne vetoed a bill in reference to the Scotch militia. In respect to money bills the House of Lords can only exercise a veto, not being permitted to propose any modification; and it employed its prerogative a few years ago to defeat the repeal of the paper duty when first proposed by Lord Palmerston's ministry. The House of Commons, in like manner, can only veto, not alter, any bills relating to the Peerage. In the United States of America the president can veto all laws proposed by Congress, but any bill thus rejected may be passed over his head, as we have seen on several occasions during the presidency of Mr. Andrew Johnson, by a majority of two-thirds in each House of Congress.

VETO ACT, the name given to a celebrated law passed by the Established Church of Scotland, for the purpose of preventing the intrusion of a minister into any parish contrary to the will of the congregation. It was first proposed in the General Assembly of 1833 by Dr. Chalmers, but was not passed until the Assembly of 1834. The old constitutional practice of the church required that the presentee should obtain a call or invitation from the people, to undertake the office of pastor over them; and it was affirmed that the spiritual act of ordination was grounded upon this invitation alone, and not upon the presentation of the patron. The evangelical and reforming party in the church believed that they possessed the power of determining the nature and amount of popular concurrence which was necessary, before the pastoral relation was formed between the minister and the people by ordination. And they laid it down as an essential principle that no clergyman ought to be settled in a parish contrary to the wish of the people. The veto law which embodied this principle enacted, that in every instance the dissent of the majority of the male heads of families, being communicants, should be a bar to the settlement of a minister. The power of the church to pass such a law was speedily challenged, and the question was tried before the civil courts. In the parish of Auchterarder, containing 3000 souls, only two persons signed the call to the presentee, Mr. Young, while 287 out of 300 communicants dissented. He was consequently rejected by

the presbytery; but the patron, the earl of Kinnoul, and the presentee brought the case before the Court of Session, and, by a majority of seven against five judges, that court decided that the Veto Act was illegal. This decision was confirmed on appeal by the House of Lords. Other similar cases speedily occurred, and were decided in a similar manner, and the collision which in consequence took place between the civil and the ecclesiastical courts ultimately caused the disruption of the church in 1843.

On the secession of the 474 ministers who founded the Free Church, the Veto Act was declared by the remnant to be unconstitutional and illegal, and was at once set aside. But a new Act was soon afterwards introduced into the House of Lords by the earl of Aberdeen, and passed into a law, empowering the presbytery to give effect to any objections the people of a parish may bring against a presentee, and to set him aside, provided the members of the presbytery shall judicially decide that in their own judgment the objections are valid. This law is still in operation, though numerous complaints have been made against its efficiency, and various attempts been made to procure its repeal.

VEZELAY. [YONNE.]

VIATKA (Wjatka), an extensive government in European Russia, and one of the Ural provinces, is situated between 55° 50′ and 60° 5′ N. lat., 46° and 54° E. long. Its area is 55,000 square miles, and the population at the last census was 2,123,904, comprising many Tartar tribes, and about 50,000 Mohammedans. The government is an irregular triangle in shape; and is bounded N. by Vologda, E. by Perm, S. by Orenburg and Casan, and W. by Costroma and Nijni-Novgorod. The country is covered by branches of the Ural mountains and by morasses, some of which are many square miles in extent, and there are also large forests. The climate is cold, being so severe that fruits will not ripen. The soil is in general clay, with no considerable tract of rich land, except on the banks of the Kama, a feeder of the Volga, that rises in the north part of the government. The principal river is the Viatka, which commences near the source of the Kama, and with various windings traverses the government from north to south, and falls into the latter at the south-western corner, after a course of about 500 miles. It receives in its course several considerable rivers. Agriculture is the chief occupation of the inhabitants. The kinds of grain cultivated are rye, barley, and oats, and a little wheat; pulse of different kinds are grown, and flax and hemp sufficient for the consumption of the inhabitants. The forests, chiefly consisting of pines, oaks, elms, birch, limes, and other trees, are a source of immense advantage: they are the resort of abundance of deer, and of fur-bearing animals. The breeding of oxen, sheep, swine, and goats is much attended to. The country people have also great quantities of bees, and the fishing in the rivers is profitable. The minerals are copper and iron. The inhabitants build boats and barges—for which the forests furnish excellent materials, and the numerous streams give easy means of transport—and manufacture coarse woollens, linen, paper, soap, potash, leather, brandy, and copper, iron, and wooden utensils. The principal commerce of the government is with Archangel, to which it exports corn, flax, linseed, honey, tallow, leather, furs, timber, tar, iron, copper, and charcoal, and receives salt, tea, foreign wines, and colonial produce. Viatka is divided into eleven districts, of which the following are the chief towns:—

Viatka, the capital of the government, is situated in 58° 22′ N. lat., 49° 45′ E. long., in a beautiful district at the confluence of the Viatka and the Chlenopka. There are twenty-three churches, all of stone, two convents, diocesan and high schools, a gymnasium, extensive distilleries, and ironworks—the latter producing anchors, gun-carriages, and machinery on a large scale. Some of the inhabitants are gold and silver smiths, but a considerable number live by agriculture. The total population is 14,800, who carry on an active trade. The town is mostly built of wood, and is the seat of government and the see of a bishop. The cathedral has some very costly decorations. The second town in the government, *Sarapol*, on the Kama, nearly 200 miles S.E. of Viatka, is ill built, and has about 6000 inhabitants, who manufacture fire-arms, soap, and leather. It is commanded by a fort on an adjacent height; has a cathedral, and two other churches; and is the centre of a large trade in timber and masts. *Slobodskoi*, on the Viatka, 16 miles N.E. of the town of that name, has numerous churches, a monastery, and 6100 inhabitants, who manufacture iron and copper, and trade in corn. *Votka*, in the district of Sarapol, on an affluent of the Kama, contains a population of 9000; and has extensive imperial ironworks, anchor forges, and musket factories, wrought by the aid of water power; an arsenal, hospital, and prisons. The ironworks employ 3000 workmen, who manufacture 70,000 muskets annually.

VIBORG. [JUTLAND.]

VIBRATION. [UNDULATORY THEORY.]

VIBURNUM, a genus of plants belonging to the natural order *Caprifoliaceæ*. *V. tinus*, the Laurustinus, now so common throughout Europe, and a very general inhabitant of the gardens of Great Britain, is a native of the south of Europe and the north of Africa. It was introduced into England in 1596. Its ancient name was *Tinus*, and from its resemblance to the laurel, *Laurus*, it was called *Laurustinus*. There are several varieties of this plant known in gardens.

All the varieties are hardy shrubs, evergreen, and bear the climate of Great Britain well: most of them blossom from November till April, and sometimes during May and June. *V. lentago*, the Lentago, or Tree Viburnum, is a native of North America, and found in hedges and on the borders of woods from New England to the Carolinas, and also in Canada. *V. lantana*, the Wayfaring Tree, forms a shrub or low tree, and is a native of Europe and the west of Asia, in low woods and hedges, and chiefly on calcareous soils. In Great Britain it is not uncommon. When cultivated it forms a handsome shrub, rising from 18 to 20 feet in height, with large broad leaves, corymbs of white flowers, and heads of fruit first green, then red, and then black. *V. opulus*, the Guelder Rose, or Snowball, is a small tree, rising from 6 to 12 feet in height, with bright green leaves in summer, but in autumn assuming a beautiful pink or crimson hue. It is native throughout Europe, and is especially frequent in Britain and Sweden. In a wild state it is not remarkable for the beauty of its flowers, but its beautiful bunches of red berries render it a very attractive plant in the autumn of the year. The Guelder Rose seemed to have derived its name from growing in the Low Countries, in Guelderland, where it was first planted, and its flowers developed in all their beauty. *V. oxycoccos*, the Cranberry Guelder Rose, flourishes in North America, on the mountains of New York and New Jersey, and throughout Canada to the Arctic circle. It grows in swamps and shady woods, and attains a height of from 6 to 12

feet, and flowers in July. Only a few plants have been at present grown in Great Britain. It bears abundance of white flowers in July, which are followed by large bunches of red fruit in September.

VICAR, VICARAGE. [BENEFICE.]

VICAR-APOSTOLIC. [ROMAN CATHOLIC CHURCH.]

VICE-ADMIRAL, in the British navy, the grade next below an admiral, corresponding in rank to a lieutenant-general in the army.

VICE-ADMIRALTY COURTS. These are tribunals established in her Majesty's dominions beyond the seas, with jurisdiction over maritime causes, including those relating to prize. The Vice-Admiralty Courts Act was passed in 1863, is the 26 Vict. c. 24, and is entitled 'An Act to facilitate the appointment of vice-admirals and of officers in vice-admiralty courts in her Majesty's possessions abroad; and to confirm the past proceedings, to extend the jurisdiction, and to amend the practice of these courts.' It repeals the 2 & 3 Will. IV. c. 51; the 17 & 18 Vict. c. 37, and parts of other Acts. Its third section enacts that in any British possession, when the office of vice-admiral becomes vacant, the governor of such possession shall be *ex officio* vice-admiral thereof, until 'the admiralty'—that is, the lord high admiral, or the commissioners for executing his office—shall make a formal appointment, and notification of the fact of his having done so shall have been received in the possession. Where the office of judge of a vice-admiralty court becomes vacant, the chief justice, or the principal judicial officer of the possession, or the person for the time being lawfully authorized to act as such, is to sit as judge until another appointment shall have been made by the admiralty, and its notification shall have been received. The appointment of registrar and marshal resides with the judge, subject to the approval of the governor, unless the admiralty, as in the other cases, elects to make its own appointment. Subject to the approval of the governor, the judge may also remove the person appointed. The judge may appoint a person to act as registrar or marshal during the temporary absence of either of those officers. On any vacancy in the office of judge, registrar, or marshal of any vice-admiralty court, the governor of the British possession in which the court is established shall, as soon as is practicable, communicate to one of her Majesty's principal secretaries of state the fact of the vacancy, and the name of the person succeeding or appointed to the vacant office. Section 7 of the Act expressly reserves power to the admiralty, by warrant, and by letters patent issued under seal of the high court in England, to appoint any vice-admiral, or any judge, registrar, or other officer. The matters in respect of which the vice-admiralty courts have jurisdiction are as follow:—

(1) Claims for seamen's wages.

(2) Claims for master's wages, and for his disbursements on account of the ship.

(3) Claims in respect of pilotage.

(4) Claims in respect of salvage of any ship, or of life or goods therefrom.

(5) Claims in respect of towage.

(6) Claims for damage done by any ship.

(7) Claims in respect of bottomry or respondentia bonds.

(8) Claims in respect of any mortgage where the ship has been sold by a decree of the vice-admiralty court, and the proceeds are under its control.

(9) Claims between the owners of any ship registered in the possession in which the court is established, touching the ownership, possession, employment, earnings of such ship.

(10) Claims for necessaries supplied, in the posse in which the court is established, to any ship of w no owner or part owner is domiciled within the po sion at the time of the necessaries being supplied.

(11) Claims in respect of the building, equippi repairing, within any *British* possession, of any sh which no owner or part owner is domiciled withi possession at the time of the work being done.

The vice-admiralty courts have also jurisdiction

(1) In all cases of breach of the regulations instructions relating to her Majesty's navy at sea.

(2) In all matters arising out of droits of admir

They have also a large jurisdiction in respe seizures for breach of the revenue, customs, trade navigation laws, and laws relating to the aboliti the slave trade, and the capture and destructi pirates and piratical vessels.

The jurisdiction of the vice-admiralty courts, e where they are expressly confined by the Act to m arising within the possession in which the court is e lished, may be exercised, whether the cause or ri action has arisen within or beyond the limits of possession. Her Majesty is empowered, by ord council from time to time, to establish rules tou the practice to be observed in the vice-admiralty c as also tables of the fees to be taken by the officer practitioners thereof for all acts to be done therein may repeal and alter the existing and all future and tables of fees, and establish new rules and tab fees in addition thereto, or in lieu thereof. A co such rules and regulations is to be laid before the H of Commons within three months of their establish The rules and tables of fees in force in any vice-a ralty courts, in any British possession, are, as soo possible after they have been received, to be entere the registrar in the public books or records of the c and the books or records in which they are so ent shall, at all reasonable times, be open to the inspe of the practitioners and suitors in the court. A co them is to be hung up in a conspicuous place in court, and another in the office of the registrar. person feeling himself aggrieved by the charges of of the practitioners in any vice-admiralty court, o the taxation thereof by the officers of the court, apply to the high court of admiralty of England, to the charges taxed, or the taxation thereof revised.

Power is given to registrars to administer oaths. the case of cross causes the judge has power, on application of either party, to direct both causes t heard at the same time and on the same evidence. appeal from a decree or order of a vice-admiralty c lies to her Majesty in council; but no appeal is allo save by the permission of the judge, from any decre order not having the force or effect of a definitive s tence or final order. The appeal must be made wi six months. The Vice-Admiralty Courts Act appli the following places:—Antigua; Bahamas; Barbad Bermuda; British Columbia; British Guiana; Bri Honduras; Cape of Good Hope; Ceylon; Domin Falkland Islands; Gambia River; Gibraltar; G Coast; Grenada; Hong-Kong; Jamaica; Labu Lagos; Lower Quebec, otherwise Quebec; Mal Mauritius; Montserrat; Natal; Nevis; New Brunsw Newfoundland; New South Wales; New Zeala Nova Scotia, otherwise Halifax; Prince Edward Isla Queensland; St. Christopher; St. Helena; St. Lu St. Vincent; Sierra Leone; South Australia; Tasm

formerly called Van Diemen's Land; Tobago; Trinidad; Vancouver's Island; Victoria; Virgin Islands, otherwise Tortola; Western Australia.

VICE-CHANCELLOR. [CHANCERY.]

VICENZA, a delegation in the kingdom of Italy, province of Venetia, is bounded N. by the Tyrol, and on the other sides by the districts of Verona, Padua, Treviso, and Belluno. It is about 50 miles long from N. to S., and 25 miles in its greatest breadth; and the area is 1100 square miles. More than half of the surface is occupied by mountains and hills; the rest, which is plain, is very fertile in corn, maize, pulse, potatoes, flax, and hemp. The pastures are extensive. Fruit trees, including the vine, are abundant; and the chestnuts in the mountains supply food to a part of the population. There is a large extent of forest; and some coal mines, but they are not extensively worked. Horned cattle and sheep are numerous. The manufactures consist chiefly of wines, woollens, and silks. The principal towns are VICENZA and BASSANO. *Cittadella*, 14 miles N.E. of Vicenza, has 6600 inhabitants, some paper and woollen factories, hospitals, elementary schools, and a theatre. Its ancient fortifications are now in ruins. *Ricoaro*, in the mountains north of Vicenza, is celebrated for its mineral baths. *Montebello* is a large village on the road from Vicenza to Verona, and contains 3100 inhabitants. The Austrians were defeated here by the French in 1800; and again by the French and Sardinians in May, 1859. *Asiago*, the head town of the Teutonic district of the Seven Communes or Sette Comuni (Sieben Perghe)—the inhabitants of which are of German descent, and speak a very corrupt or very ancient dialect of that language—is situated in the mountains north-west of Bassano; it has a substantial church, and 5840 inhabitants, who are celebrated for the manufacture of straw hats (vast numbers of which are made here), turnery, cabinet, and all kinds of carpenters' work.

VICE'NZA (the ancient *Vicentia*), a city of Italy, capital of the delegation of Vicenza, is situated in a fertile country on the Bacchiglione, in 45° 32′ N. lat., 11° 33′ E. long., 40 miles W. from Venice by railway through Padua, and had, in 1863, 33,300 inhabitants. It is inclosed by dry moats, which are partly cultivated, and by dilapidated walls, about 3 miles in circumference; and is very rich in palaces, many of them the finest works of Palladio; but the general appearance does not correspond with the elegance of these mansions. The cathedral and churches of Vicenza abound in paintings by native artists. The Teatro Olimpico, which was not finished till after Palladio's death, is an imitation of an ancient theatre. The public buildings also comprise a campanile, Basilica, episcopal palace, a triumphal arch leading to the Campo Marze, an orphan asylum, and several hospitals. There are nine bridges across the Bacchiglione. Vicenza gives title to a bishop; it has a lyceum, two gymnasia, an ecclesiastical seminary, a college for boarders, and a public library with 36,000 volumes and about 200 MSS. There are also several private collections of minerals and fossils, with which the country abounds. The remains of antiquity consist of the ruins of a Roman theatre, some portions of a palace, and three arches of an aqueduct near the village of Olbia. Vicenza has been long known for its important silk manufactures. Woollen and linen fabrics, hosiery, hats, paper, porcelain, earthenware, leather, whalebone, and gold and silver articles, are also made here. The inhabitants likewise trade in wooden wares, corn, and other agricultural produce.

Near the city is the *Monte Berico*, which is joined to it by a continued line of arcades, with 168 arches. Outside the town are the public cemeteries, and the *Porta del Castello*, a remarkable tower.

Vicentia was founded above a century before the Christian era; and became a Roman municipal town. After being pillaged successively by Alaric, Attila, the Lombards, and the Emperor Frederick II., it came into the possession of the Venetians early in the fifteenth century; and they held it till the downfall of their republic in 1796. From that time to 1815 it formed a part of the French kingdom of Italy, and was united to Austria in the latter year. It was cruelly bombarded by the Austrian troops, June 10, 1848. By the cession of Venetia in 1866, it was incorporated with the new kingdom of Italy.

VICEROY (*vice-roi*, 'in place of the king'), a title given to a person delegated as the governor of a large and important dependency of a kingdom, such as Naples, Spain, and Peru, under the old Spanish monarchy. In ordinary conversation and writing the lord lieutenant of Ireland is often called viceroy, but he is never so recognized officially.

VICHY. [ALLIER.]

VI'CIEÆ, a tribe of plants belonging to the natural order *Leguminosæ*, and agreeing with the genus *Vicia* in their most prominent characters. The most important genera belonging to this tribe are *Vicia*, *Faba*, *Pisum*, *Ervum*, *Lathyrus*, *Orobus*, and *Cicer*, forms which systematists now include in the sub-order *Papilionaceæ*.

The species of the genus *Vicia* are usually climbing herbs. Many of the species are much in use as green crops for feeding cattle, sheep, &c. *V. sativa*, common Vetch, or Tare, is a native of Europe, and its extensive cultivation diffuses it more abundantly. [TARES.] It is also found in North America, about Fort Vancouver. *V. biennis*, Biennial Vetch, indigenous in Siberia, is very hardy, continuing green through the winter, and furnishing an early fodder. *V. cracca*, Tufted Vetch, is found all over Europe, and is common in Great Britain in bushy places. The species of *Vicia* are easily cultivated, and will grow in any common soil.

The only species of the genus *Faba* is the *Faba vulgaris*, formerly *Vicia faba*, the Garden-bean and Horse-bean. This plant, which is now so extensively cultivated for the sake of its seeds, for the food of both man and beasts, is said to be found wild in Egypt.

The genus *Pisum* contains *P. sativum*, the Garden Pea, and *P. arvense*, the Gray Pea. [PEA.] *P. maritimum*, the Sea Pea, is a native of France, Denmark, and other parts of Europe, and also of Kamtchatka. In Great Britain it is found on the pebbly beach of Lincolnshire, Sussex, Kent, and Suffolk.

Most of the species of the genus *Ervum* are weeds, two of which, the *E. hirsutum* and *E. tetraspermum*, flourish in Great Britain. *E. lens* is the plant which produces the Lentil. It is a native of corn-fields on the continent of Europe.

The species of the genus *Lathyrus* are above sixty in number. They are usually climbing herbs. *L. sativus*, Chickling Vetch, is a native of Spain, France, and Italy. *L. latifolius*, Broad-leaved Everlasting Pea, grows in the European woods; and is found in Great Britain. It is one of the handsomest plants of the genus, and is a great favourite in our cottage gardens. *L. tuberosus*, Tuberous Everlasting Pea, is a native of Europe, but not wild in Great Britain. *L. odoratus*, the Sweet Pea, indigenous in Sicily, and has long been a favourite in our gardens on account of its sweet-

scented flowers. *L. tingitanus*, *L. articulatus*, and *L. annuus*, are frequently sown in gardens as border annuals: they form a variety, but have no scent in their flowers, nor are they so handsome as the Sweet Pea.

Of the genus *Orobus* the most valuable species are the following:—*O. tuberosus*, the Tuberous Bitter Vetch, is a native throughout Europe, and abundant in Great Britain. *O. luteus*, Yellow Bitter Vetch, ranges over the Alps of Switzerland, France, Italy, and Siberia. It has handsome orange and yellow flowers. *O. niger*, Black Bitter Vetch, is a native of subalpine districts in Europe. It is found in Forfarshire and Inverness-shire in Scotland. The flowers are purple, and the plant turns quite black on drying. There are about forty other described species of *Orobus*. They are all elegant flowering plants, and being hardy, may be cultivated in the open flower-border. For the genus *Cicer* see CICER.

VICKS'BURG, a city and port of entry, is situated on the Mississippi River, 400 miles above New Orleans, and 50 miles W. of Jackson, with which it is connected by the Vicksburg and Brandon Railroad. The situation is elevated, the ground uneven, and the city is not compactly built. It contains, besides the county buildings, four or five churches, and several academies for both sexes. Three newspapers are published. Vicksburg is the most commercial place on the river between Natchez and Memphis, and is an important mart for cotton—of which article about 100,000 bales are annually exported. The greater part of this is received by railroad. Steamboats ply regularly between Vicksburg and New Orleans. The town withstood a very protracted siege during the American civil war, but famine ultimately obliged it to surrender to the Federals, under General Grant, on the 4th of July, 1863. Its capture involved the loss to the Confederates of 70,000 stand of arms, 200 cannon, and 30,000 prisoners. The population of Vicksburg in 1860 was 4591.

VICO'A, a genus of plants of the natural family of *Compositæ* and sub-tribe *Inuleæ*. The species are natives of and found in most parts of the plains of India: some of them extend into the islands of the Indian Ocean.

VICTORIA. [HONG KONG.]

VICTORIA. [VANCOUVER'S ISLAND.]

VICTORIA, a colony of Great Britain occupying the S.E. corner of the Australian continent, lies between 34° and 39° S. lat., and 141° and 150° E. long. It is bounded on the N.E. and N. by New South Wales, from which it is divided by a straight line from Cape Howe to the nearest source of the Murray River, and then by that river to the boundary of South Australia; W. by South Australia, from which it is divided by the 141° meridian of E. long.; and S. by Bass' Strait, which separates it from Tasmania; and E. by the Pacific Ocean. The length from E. to W. is about 500 miles, and its mean breadth, measured on the meridian of 144°, about 200 miles. The total area is 86,831 square miles, or 55,571,840 acres, the colony being thus about equal in size to England, Scotland, and Wales united.

Coast.—The coast is generally low and unbroken in the W., from the mouth of the Glenelg to Cape Otway, between which are situated the available harbours of Portland, Port Fairy, and Warnambool; and in the E. from the harbour of Port Albert, in long. 147°, to Cape Howe, between which latter points almost the only features which tend to diversify its monotonous appearance are a series of lagoons, of which Lake King is the largest. From Wilson Promontory to Lake Otway the coast becomes skirted with perpendicular
from 500 feet to 1000 feet above the sea,
by numerous bays. Of these the most
Port Philip, which, scarcely 2 miles wide at
forms a kind of inland sea, stretching from
about 35 miles, and expanding from E. to
centre, to 50 miles, though its average wid
miles. The total area is about 880 squa
consequence of the narrowness of its entra
with its vast extent, the water is always
the harbour is thus rendered one of the
as largest in the world. Separated from P
a low promontory is the well-formed but
bour of Western Port, effectually protected
Grant Island at its mouth, and divided int
W. arm by French Island near its centre.
E. the most remarkable feature of the co
Promontory, the southern extremity of the
of the continent of Australia, connected wi
land by a low sandy isthmus. It consis
mass of granite, with summits rising to
3000 feet, and usually enveloped in mist.
into the sea for a distance of nearly 20
from 6 to 14 miles wide. On the N. of thi
is the last great indentation of the coast,
protected S. and E. by several low sand
which the largest is La Trobe. The cent
faces the S. and E., and has an extent
miles.

Surface.—The interior is finely diversi
mountains and plains, but is chiefly cha
the latter, which are often of great ex
sparingly wooded and free from other obst
it has been said the plough could in so
drawn continuously for 100 miles across
suited to agricultural purposes. The mo
two principal ranges near the opposite e
the colony. The E. range is a continu
Australian Cordillera, or long chain whi
from N. to S. through NEW SOUTH WALE
distance from the coast, and nearly pa
Shortly after attaining its culminating p
feet in Mount Kosciusko or Wellington,
under the name of the Australian Alps, en
and proceeds S.W., with a bold outline b
diminishing height, to the coast at Wilson
from which it is continued almost visibly b
of Bass' Strait to Portland Cape, and thenc
to the S. extremity of Tasmania. This ra
numerous ramifications, chiefly N. and W
an area estimated at 7000 square miles. T
which runs at a distance of from 40 to 5
the coast, and which is called the Gra
mences in Mount Zero, 36° 52′ S. lat.,
long., and stretches S. for 54 miles, with
20 miles, to its termination at Mount Stu
rises abruptly 1070 feet above the level
in 37° 38′ S. lat. It forms three distin
ridges—a north, south, and west, called
the Grampians Proper, the Sierra, and the
which have their common nucleus and
point near the centre in Mount William,
which above sea-level is 4500 feet. Th
summits which occur in the N. are gener
rocky, but have some fine timber on the
the S. one of the most remarkable summ
Abrupt, a few miles N.W. of Mount Stu
1700 feet in perpendicular height, and con
446 feet in breadth, and 80 feet in av

Gipp's Land, which lies in the E. of the colony, and is bounded by the Australian Alps on the N. and W., and by the sea on the S. and S.E., has a cool and rather moist climate, and some Alpine characteristics. Snow lies on the high lands during a great part of the year, and cool and refreshing streams flow perennially. The country south of the great spur, extending westwards from Melbourne to the 141st meridian, consists of plains broken by schist ranges and volcanic hills of inconsiderable height. The central plain, north of the mountains, is traversed by hills of moderate elevations; some bare, others wooded and grassy to their summits.

Geology and Minerals.—The Grampians and the Australian Alps, notwithstanding their position at opposite extremities of the colony, are visibly connected by ramifications, so as to form parts of the same mountain system, and thus constitute a continuous water-shed, sending the whole drainage of the colony either north to the Murray River or south to the ocean. It may be considered as a vast region of primary and transition formations, extending east to west for about 300 miles, with breadths varying from 100 to 150 miles, exhibiting numerous cones and extinct craters, apparently submarine, and composed chiefly of metamorphic rocks of granite, sienite, quartz, gneiss, &c., overlain on their slopes by more recent secondary and tertiary formations. Within this region lie the gold-fields of Victoria, which have added so much both to its wealth and population. They are described under a separate heading in a later part of this article. Limestone, granite, and sandstone are worked in quarries apparently inexhaustible; and small quantities of coal, tin, and antimony have also been found.

Rivers and Lakes.—The rivers of Victoria are more numerous than important. In the rainy season they fill their channels, overflow their banks, and have all the appearance of magnificent streams; but as the summer advances they shrink rapidly in their dimensions, and ultimately, for the most part, become either altogether dry, or leave only a chain of large and deep, but often unconnected pools. By far the most important river is the Murray, which, as already mentioned, forms the N. frontier, and receives the whole of the drainage of the N. side of the water-shed of the colony. The magnitude of its volume is small in proportion to its length. It was explored in 1851 by the governor of the colony as far as the junction of the river Darling, being the first exploration made since its discovery by Stuart in 1830. Its chief feeders are in NEW SOUTH WALES, in which article the river is described, the streams flowing into it from Victoria being only small, such as the Mitta-Mitta and Ovens towards the E., and the Goulburn, Campaspé, and the Loddon, or Yarrayne, towards the centre. In the southern water-shed the principal rivers are the Snowy River, or Margalong, the Tumbo, Nicholson, Mitchell, Avon, Macalister, and La Trobe, which contribute to form a chain of lagoons; the Yarra-Yarra, or 'ever-flowing,' on which the capital is built, and to which it is navigable by vessels of 200 tons, and along with it the Salt-Water River, Werribee, and Little River, all falling into Port Philip; the Moorabool and Barwon at the entrance to Port Philip; and the Glenelg near the W. boundary. The lakes are numerous, but vary very much in size, according to the seasons, very few of them being fed by perennial streams. Some of them altogether disappear during the dry season, although they cover extensive areas at other times. By far the largest lake is that of Corangamite, about 50 miles W. of Geelong, which is about 90 miles in circuit, and although fed by fresh-water rivers, it is quite salt.

Climate and Productions.—The mean annual temperature of the seasons in Victoria is—spring, 58·7; summer, 67·1; autumn, 59·4; winter, 50·3. The rain-fall is not liable to those great disturbances which in some parts of Australia produce droughts at some seasons, and disastrous floods at others.

In autumn and winter the northerly winds exceed the southerly, and in spring and summer the reverse is the case. In summer the north wind from the interior is often dry and hot; but at night it generally changes to the south-west or south, and from either of these points it is always cool and refreshing.

In a paper on the colony and climate of Victoria, prepared by R. Brough Smyth, Esq., F.G.S., London, and secretary of the Department of Mines in Victoria, he says:—'The climate is indeed delicious. Probably in no part of the world is it possible to find fewer impediments to labour or recreation, as regards the weather, than in Victoria. Though the summer is invariably marked by a few days of great heat, yet, even in that season, there are many days when the weather is pleasant and cool, and nothing can exceed the climate experienced in this colony during the autumn, winter, and spring. A cloudless sky, a bright sun, and a refreshing breeze are characteristic of the greater number of days in each of these seasons; and while the salubrity of the climate is shown by the absence of those diseases which yearly sweep off so many in England, it is yet equally favourable to the growth of the fruits and vegetables of colder countries. The river basins are mostly at right angles to the sea, so that the sea breezes penetrate far inland. The apple, pear, peach, nectarine, apricot, almond, gooseberry, currant, and fig; and the cabbage, cauliflower, turnip, carrot, parsnip, asparagus, pea, bean, water melon, rock melon, and tomatoes, may be seen all growing together luxuriantly in the same plot of ground; while the borders blossom with the fuchsias, geraniums, and other common flowers of the English garden.'

The wines made in Victoria have taken a high place in the estimation of competent judges, and the cultivation of the grape will, it is certain, shortly form a source of great wealth. Already large vineyards have been planted, and while the quality of the wine is such as to command a ready sale at a high price, the yield per acre is large, the average being about 250 gallons. The whole quantity made in the colony in 1866 was 127,400 gallons.

In consequence of the irresistible attractions of the gold-fields, the agricultural capabilities of Victoria have, until within the last very few years, been comparatively neglected. Great advances were, however, made in 1866, and in 1867 the colony was able to export a large quantity of wheat and flour, whereas a considerable portion of the breadstuffs consumed in it a few years since was imported. The constantly increasing quantities of land brought under cultivation, with the aid of the steam plough lately introduced, assisted by the vast reservoirs now in rapid course of construction in various parts of the colony, and which are to be applied to irrigation as well as mining, must necessarily give every year much more wheat than can be consumed, and thus afford a yearly increasing surplus for exportation. The colony contains fine soils suitable for maize, wheat, rye, barley, oats, peas, beans, potatoes, the grape, olive, fig, date, coral tree, sorghum, sugar, millet, and tobacco: and in certain favoured situations the tea plant would

previous to 1875. The interest on the loan and repayment of part of the principal, and the expense of working the railways, are the largest items in the expenditure of the colony.

Victoria is well defended on its coasts, and has a volunteer force of 4000 men, besides two corps of a volunteer naval brigade.

Imports and Exports.—The following are the values of the exports and imports of the colony from 1856 to 1865:—

Year.	Imports. Total Value.	Exports. Total Value.
	£	£
1856	14,962,269	15,489,760
1857	17,256,209	15,079,512
1858	15,108,249	13,989,209
1859	15,622,891	13,867,859
1860	15,093,730	12,962,704
1861	13,532,452	13,828,606
1862	13,487,787	13,039,422
1863	14,118,727	13,566,296
1864	14,974,815	13,898,384
1865	13,257,537	13,150,748
1866	14,771,711	12,889,546

The chief exports are gold and wool, but large quantities of tallow, hides, and skins are also shipped. The principal imports are apparel and haberdashery, beer and cider, cotton, linen, silk, and woollen goods, hardware, spirits, sugar, tea, tobacco, and wine. More than half the commerce of the colony is with the United Kingdom.

The number of vessels which annually arrive and depart averages 2000, of about 630,000 tons burthen.

Railways.—Victoria has a more extensive system of railways than any other of the Australian colonies. It consists of two main lines, one from Melbourne to Sandhurst, 101 miles in length, and the other from Melbourne to Geelong and Ballarat, with a short branch to Williamstown, the port of Melbourne, 96 miles long. The Geelong and Melbourne line was purchased by the government in 1860, and an extension from Sandhurst to the river Murray at Echuca, of a length of 56 miles, has since been sanctioned.

Constitution and Government.—The legislative authority in Victoria is vested in a Parliament of two chambers; the Legislative Council, composed of thirty members, and the Legislative Assembly. Members of the council must be owners of property worth 5000*l.*, or possess an income of 500*l.* a year. All candidates must deposit 100*l.* with the returning officer before the nomination day. The money is returned to candidates who poll one-fifth of the number of votes polled by the successful candidate. Owners, lessees, and occupiers of property valued at 1000*l.* or 100*l.* a year, barristers, solicitors, medical practitioners, ministers of religion, officers in the army and navy, schoolmasters, &c., are entitled to vote, apart from any money qualification. Six members of council retire every two years. While the constitution provided that the duration of Parliament should be five years, an Act was passed in 1857 limiting it to three years. The Legislative Assembly, which was formerly composed of sixty members, now consists of seventy-eight. Any man of twenty years of age untainted with crime is eligible to become a candidate; owners of freeholds valued at 50*l.* or 5*l.* a year, and naturalized males over twenty-one years, are entitled to vote. Candidates for the assembly must deposit 50*l.* with the returning officer on the nomination day. Members of the legislature are not entitled to any remuneration for services rendered. The executive is vested in a governor-general, appointed by the Crown, who is likewise commander-in-chief of all the colonial troops, and has a salary of 10,000*l.* a year, so that it is the most lucrative appointment in the gift of the Crown, except the governor-generalship of India. The salary is paid by the colony. In the exercise of the executive the governor is assisted by a cabinet of ten ministers, called the chief secretary, the minister of justice, the attorney-general, the treasurer, the president of board of land and survey, the commissioner of public works, the commissioner of railways, the commissioner of customs, the minister of mines, and the postmaster-general. The ministers must be members of either of the Houses of Legislature, and they are individually and collectively responsible for their acts to the colonial Parliament.

Religion and Education.—There is no state church in Victoria, all denominations being on an entirely equal footing. A sum of 50,000*l.* is annually paid by the state to the different religious bodies, including Jews, who choose to take it, in proportion to their numbers; but there is no doubt this will shortly be discontinued, as some of the sects have voluntarily given it up, and an Act has more than once very nearly passed the legislature for the abolition of the grant. The following were the numbers of the leading denominations at the last census:—Church of England, 205,000; Church of Scotland, 37,000; Scotch Presbyterians, 38,000; Roman Catholics, 108,000; Wesleyans, 41,000; Independents, 13,000; and Lutherans, 10,000. The number of churches and chapels increased from 349 in 1855, to upwards of 1900 in 1868.

The educational system of Victoria is one of its chief glories, and might well be adopted, with suitable modifications, in the mother country. Finding that the denominational system by no means met the necessities of the case, in 1862 the colonial legislature established a thoroughly national system, and nearly 200,000*l.* of the public revenue is now annually devoted to its support. Every school that is assisted by the state must be open to the children of all religious denominations without the least distinction, and every child must receive at least four hours' useful secular instruction daily. No religious teaching is given during the ordinary school hours; but both before and after them the greatest facilities are afforded to the ministers of the various religious denominations to instruct the children of their particular faith, should their parents desire it.

In 1866 there were 1080 public and private schools in Victoria, or one school to every 586 of the population. The number of scholars was 79,378, or one to every 7·97 of the population. The number of teachers was 2130. In the last ten years great advances have been made in the number of schools. In 1857 the number receiving aid from the revenue was 540, the number of scholars being 33,234. In 1861 the numbers were, schools, 671; scholars, 51,345; and in 1865 they were, schools, 676; scholars, 64,926. Of the 79,378 scholars in 1866, 68,000 were attending schools that received aid from the revenue. The amount voted for education in 1866 was 174,247*l.*, averaging 5*s.* 6¾*d.* per head of population, or 3*l.* 7*s.* 8*d.* per scholar in average attendance. If the same sum were voted per head of population in Great Britain as was voted in Victoria, it would amount to 6,789,959*l.*, whereas the actual sum is about 750,000*l.*, or 7½*d.* per head.

Victoria has several newspapers conducted with great ability; and for a new colony its postal system is very effective.

Towns.—MELBOURNE and GEELONG, the two chief

and 2½ inches in thickness, and there are two compartments fitted with slides, in which cages run. Many of the mines are extensive and well conducted, and are under the control of competent managers. The gold occurs in small grains, scales, and occasionally in large waterworn pieces, weighing sometimes as much as 1000, 2000, or 3000 oz. The number of persons now engaged in gold mining is about 80,000, of whom 20,000 are Chinese. The average earnings are only about 30*s.* per week, so that the remuneration is by no means high—but the speculative nature of the work is a great attraction. As a rule the alluvial miners obtain the largest amounts.

The following is the amount of gold yielded in Victoria since its first discovery:—

Years.	Ozs.	Value at £4 per oz.
1851 (three months), . .	145,146	580,584
1852, ...	2,218,782	8,875,128
1853, ...	2,676,345	10,705,380
1854, ...	2,150,730	8,602,920
1855, ...	2,751,535	11,006,140
1856, ...	2,985,991	11,943,964
1857, ...	2,762,460	11,049,840
1858, ...	2,528,478	10,113,912
1859, ...	2,280,950	9,123,800
1860, ...	2,156,660	8,626,640
1861, ...	1,967,420	7,869,680
1862, ...	1,658,207	6,632,828
1863, ...	1,626,872	6,507,488
1864, ...	1,544,694	6,178,776
1865, ...	1,543,801	6,175,204
1866, ...	1,482,237	5,928,948
Total, ...	32,480,308	129,921,232

Of this quantity 31,124,768 oz., value 124,489,072*l.*, have been exported, chiefly to Great Britain.

Population and Immigration.—The population of Victoria in 1867 was 643,876—364,746 males, and 279,130 females. In 1836 the number was only 224. In 1838 it was 3511, and the population in subsequent years was as follows:—11,738 in 1841; 32,879 in 1846; 77,345 in 1851; 236,776 in 1854; 410,766 in 1857; 540,322 in 1861; and 616,375 in 1865. This vast increase has, of course, chiefly been caused by immigration from the United Kingdom. The number annually arriving from the mother country since the establishment of the colony has been as follows:—

1838, . .	3	1848, . .	7,399	1858, . .	21,666
1839, . .	1,161	1849, . .	10,562	1859, . .	14,030
1840, . .	3,473	1850, . .	4,682	1860, . .	12,929
1841, . .	9,894	1851, . .	6,212	1861, . .	14,256
1842, . .	864	1852, . .	63,719	1862, . .	15,353
1843, . .	627	1853, . .	40,469	1863, . .	20,261
1844, . .	934	1854, . .	51,291	1864, . .	13,909
1845, . .	423	1855, . .	21,072	1865, . .	9,713
1846, . .	81	1856, . .	24,314	1866, . .	8,531
1847, . .	387	1857, . .	40,921		

Total, 29 years, . . 419,186

A large proportion of the people are in the prime of life; when the last census was taken more than half were between twenty and forty-five years of age, about half were under twenty-five, and a sixth were under five. There were 121,000 women above fifteen years of age, and 91,000 of them were or had been married, and to the 30,000 spinsters there were 113,000 bachelors above fifteen years old. The excessive disparity of the sexes is, however, disappearing. Up to 1846 the men were about twice as many as the women, but the proportion changed to two women to three men until the gold mining brought such a large number of men as to re-establish the former ratio; but now the proportion has been much corrected. The aborigines were but 1694 in 1861; the Chinese, 24,732, of whom only eight were women.

With the view of encouraging immigration as much as possible one-fourth of the proceeds of all the government land sold is devoted to that purpose, and the emigration commissioners in Great Britain are empowered to grant free passages to single female domestic servants of good character between eighteen and thirty-five years of age; also to a few married agricultural labourers and their wives under forty years of age, having, if any, not more than two children under twelve years of age. The eligible candidates must have been accustomed to work for wages in their respective callings, and must produce satisfactory certificates of good character. They must make their applications on certain printed forms which can be obtained from the commissioners or their agents. The entire cost of the passage in these cases is defrayed by the commissioners out of the colonial funds, and partial assistance in the shape of railway and steamboat passes is also granted to single females to aid them in reaching the port of embarkation. The commissioners can also grant assisted passages to a few other married couples with not more than two children under twelve years of age upon their paying a small sum, and residents in the colony, by making small payments to the colonial government, may obtain what are called 'passage warrants' for the introduction of their relatives and friends. The supply of skilled labour in the colony is sufficient for present requirements—the great demand being only for female servants and good farm labourers. The wages in Victoria are much higher than in England and the cost of living about the same in both countries, House rent is rather dearer in the colony than in the mother country, but meat is very much cheaper—the best mutton being sold for 2*d.* per lb. The artizans generally only work eight hours a day.

Revenue and Expenditure.—The annual revenue and expenditure of the colony each amount as near as possible to 3,000,000*l.* per annum—the precise figures of the revenue for the year ended 30th September, 1867, being 3,040,761*l.* The revenue is chiefly raised from customs import duties, an export duty of 6*d.* per oz. on gold, sales and rent of land, and the railways, which belong to the government. The debt of Victoria amounts to about nine millions, of which not more than one million is held in the colony, the rest in Great Britain. This debt is almost entirely composed of a great railway loan, authorized in 1858, and amounting to eight millions sterling, at 6 per cent. Seven millions of this sum were made payable in London. The total of eight millions, it is probable, will be exceeded to some extent in the construction of the railways, in consequence of unanticipated liabilities involved in the purchase of the Geelong and Melbourne line from a private company, with the object of completing the railway system under the superintendence of the government. The remainder of the colonial debt consists of several other sums that amounted originally to above a million and a half sterling. One of these items was 500,000*l.*, and another 200,000*l.*, contracted in the year 1854, on behalf of the municipalities of Melbourne and Geelong, and repayable by the government; another was for 820,000*l.*, expended in the construction of water-works for Melbourne. The great railway loan is not entirely repayable until the year 1891; but the other liabilities are to be discharged

stage of development, from the conical brown bud whose opening leaves just discovered the creamy petals within, to the crimson splendour of the fully developed flower. (See Plate, 'Victoria Regia.') In compliment to his sovereign Sir Richard named it the *Victoria Regia*.

Some plants were imported into England, and have been successfully cultivated at Chatsworth, Kew, the Botanic Gardens of Glasgow, and elsewhere. They have also been introduced into India from seeds obtained in England.

VICTUALLERS, LICENSED. [ALEHOUSES.]

VICUNA. [LLAMA.]

VI'DUA, a genus of birds represented by the Whidah Birds, or Widow Birds (*Les Veuves* of the French), natives of Africa, and remarkable for the development of the caudal feathers in the male during the breeding season, when the plumage altogether assumes a new character. They are included in the sub-family *Ploceinæ*, or Weavers, and family *Fringillidæ*, or Finches. Examples, *Vidua Paradisea* and *Vidua erythrorhynchus*. Habits and manners, those of the FRINGILLIDÆ generally. They are closely allied to the Buntings and Finches.

VIENNA (in German *Wien*, but locally *Kaiserstadt*, or 'The Emperor's City,' and the *Vindobona* of the Romans), the metropolis of the Austrian empire, is situated in 48° 10′ N. lat., and 16° 20′ E. long., on the right or south bank of an arm of the Danube, into which the dirty little river Wien, from which the city is named, discharges itself, on the E. side of the old city. Vienna is 390 miles W.N.W. of Milan, 800 N.W. of Constantinople, 137 N.W. of Pesth, 340 S.S.E. of Berlin, 380 E.S.E. of Frankfort, 250 S.E. of Prague, and 650 E. by S. from Paris. The population in 1867 was about 570,000.

Vienna consists of the interior, or old city, the Innerestadt, and the suburbs. The former is nearly circular, not above 3 miles in circumference, and has only about 55,000 inhabitants. It was formerly surrounded with a broad fosse, and a wall from 40 to 50 feet high; but they are now removed, and all around the city proper is a space varying in width from 960 to 1500 feet, which was once the glacis of the fortifications, and reserved as a clear space without the walls, but is now planted with grass, and laid out in public walks, having fine avenues of acacia and chestnut trees, and adorned with some handsome houses. Beyond this space are upwards of thirty suburbs, and there are two others in the island of Leopoldstadt, in the Danube. These suburbs are surrounded by what are called the lines—a fosse with a wall 12 feet high. They extend altogether about 16 miles in circumference, and are pierced by thirteen gates.

The inner, or old city, was formerly very irregularly built, and many of the streets are still crooked and narrow, but of recent years very great improvements have taken place in the buildings, not only in the city, but in the suburbs; in fact, Vienna, altogether, has been the seat of an architectural revolution, more extensive, perhaps, than in any other European capital, Paris excepted. The situation of the city is about 480 feet above the sea, and as, in the south part, it rises from the Danube in terraces, a considerable declivity is given to many of the streets. Other parts of the city are, however, so little above the level of the river that they are occasionally liable to inundations. The Places (open places or squares) are about twenty in number, some of them very well laid out, but the others small and irregular. Among the best are the New Parade, the Hof, the Hohe Markt, the Josephsplatz, the Graben, and the Burgplatz. The New Parade is nearly 1000 feet in length, and 650 in breadth, perfectly regular, surrounded with avenues of trees, and laid out with grass plots and flower beds. Some of the squares are adorned with fine fountains and statues. Amongst the latter are handsome equestrian statues of Joseph II., Prince Eugène, and the Archduke Charles, and a colossal bronze statue of the Emperor Francis. The streets of the old city are, in general, well paved and cleansed. It is singular that this part of Vienna is the most fashionable, containing the palaces of the emperor, of many of the principal nobility, the public offices, the finest churches, and most of the museums and public collections, the colleges, the exchange, and the most splendid shops. This marks the social aspect of Vienna from all the other great cities of Europe, where the nobility shun the old parts and reside in the new, or the suburbs. The houses, which are in general of brick, are very high and large. Most of them are inhabited by several families, each occupying one floor, or part of one. There is a common staircase, and a porter keeps the street door, which is closed at night at ten o'clock, and only opened afterwards on payment of a fee. The streets in the suburbs are broad and straight, all converging to the centre of the old city; but as most of them are unpaved, they are liable to be very dusty in summer and muddy in winter.

The public buildings, palaces, churches, &c., are very numerous. The most remarkable is the cathedral, dedicated to St. Stephen, which was restored in 1864; it is a beautiful structure, 342 feet in length, and 222 in breadth between the two great towers. One of the four towers or steeples is 465 feet high, the loftiest in Europe with the exception of that of Strasbourg, and is a masterpiece of Gothic architecture. The interior is enriched with numerous beautiful altars and monuments. It stands on the site of an older church, parts of which still remain, and was built between the years 1359 and 1480. It contains a bell, weighing 18 tons, cast from cannon taken from the Turks in 1711. St. Peter's, built on the model of St. Peter's at Rome, is adorned with fine frescoes and oil paintings. The elegant church of the Augustines contains the celebrated mausoleum of the Archduchess Christina, a masterpiece of Canova, which cost 20,000 ducats. The great Votive church, a reduced reproduction of Cologne cathedral, a grand and pretentious building, was commenced in 1856 and completed in 1867. It is situated outside the old city, and was subscribed for in all parts of the empire as a monument of gratitude for the preservation of the emperor's life from attempted assassination. Many of the other churches are remarkable either for their beauty or their antiquity. The Jews have three synagogues, one of which has a most magnificent interior. The Burg, or imperial palace, is an old irregular edifice, built at different times, and consisting of three quadrangles; it contains the imperial jewel office, one of the richest collections of valuable curiosities in Europe, a fine cabinet of works of art, a very extensive collection of natural history, and the cabinet of medals, which far surpasses all other collections of the kind. The Imperial Library, connected with the Burg, is a handsome edifice, with a saloon, and a gallery 250 feet long, and in the centre 100 feet broad, in which is the library, consisting of above 350,000 volumes and 16,000 manuscripts. It is rapidly increasing, as a copy of every book published in the empire must be sent to it. The building formerly called the imperial chancery; the imperial riding school; the splendid palace of the Archduke Charles, containing an

extensive library and a collection of 180,000 engravings (among them being Raphael's own sketch of the Transfiguration); the mint, the university, the town-house, the archbishop's palace, the imperial arsenal (which contains manufactories of all kinds of weapons, and an armoury containing one of the largest and finest collections of arms and armour in Europe); the city hospital, the great arsenal, the bank, the chanceries, the custom-house, the Heinrich's Hof, and the new opera house, are among the large public buildings of Vienna. The two last mentioned are new and exceedingly handsome. The palaces of the nobility are numerous, and most of them contain good collections of paintings and other works of art. The Ambras Museum has a good collection of armour and art treasures, and some fine pictures by Raphael, Salvator Rosa, Paul Veronese, Titian, the Caracci, Correggio, Rubens, Van Dyck, and others. Strangers are readily admitted to all the public institutions in the city. There are eight theatres.

The hospitals and other charitable institutions are numerous and well endowed. The general hospital, founded by Joseph II., is a very large building, containing nearly 3000 beds; above 16,000 patients are annually received in it. The lying-in hospital, the foundling hospital, the lunatic asylum, the deaf and dumb asylum, the hospital of the Charitable Brothers, and the invalid's house, are also all large institutions.

Vienna is the see of an archbishop. The principal establishment for education is the university, founded by Duke Rudolph IV. in 1365, but entirely remodelled by Maria Theresa. It has by degrees become the first medical school in Germany; it is attended by above 2000 students, and has eighty professors, and a library of 120,000 volumes, an observatory, a botanic garden, an anatomical theatre, a veterinary school, a laboratory, and other appendages. The Josephinum, founded by Joseph II., is a medical institution for the instruction of surgeons for the army, with very rich collections. Other establishments worthy of notice are, the Imperial Oriental Academy, the Academy of Engineers, the Academy of the Fine Arts, the Normal School, and the Polytechnic Institution, which is attended by about 500 pupils, who are educated in science, the arts, trades, and manufactures. There are also numerous very excellent schools in the city.

Vienna being the centre of the Austrian dominions, is likewise the principal seat of commerce and manufactures. Its trade is with Hungary, Turkey, Italy, and other countries. Since the establishment of the Danube Steam Navigation Company, whose vessels go to Constantinople, Trebizond, and Smyrna, the trade with the Levant has greatly increased. Manufactures of every kind are carried on in the city, and employ above 100,000 workmen. The principal are silk, velvet, shawls, meerschaum pipes, in which much taste is displayed, gold and silver lace, cottons, woollens, ribbons, carpets, leather, porcelain, jewellery, mathematical and musical instruments, fire-arms, gold and silver plate, watches, fine cutlery, carriages, gloves, lace, straw hats, paper, &c.

The suburbs contain numerous palaces and gardens of the nobility, a great number of handsome private houses, forty churches, and ten convents. There are several bridges in Vienna; two of them, the Asspern over the Danube Canal, and the Schwarzenberg over the Wien, though small, are remarkable works, and not surpassed for elegance of design by any bridges recently constructed in Europe. Few cities are surrounded by so many fine gardens, many of which contain the richest and rarest plants. The environs are very picturesque, being surrounded by vineyards, and having the Kahlenberg mountains on the W., the islands of the Danube on the N., and the Schneeberg mountain, part of the Norie Alps, on the S. Among the palaces in the vicinity is Schönbrunn, 2 miles W., the country residence of the emperor, with a botanic garden and menagerie; and *Laxenburg* has also an imperial summer palace and a spacious park.

The public promenades, which are the great places of resort for the citizens of Vienna, are the glacis, or esplanade between the city and the suburbs; the Volksgarten ('the people's garden'); the private gardens of the palaces of Liechtenstein, Rasumowsky, Schwarzenberg, and the Belvedere; and the Prater, in the suburb Leopoldstadt, which is an immense park. The Prater is a league and a half in length, and is traversed by six noble avenues of chestnut trees, running in different directions, the principal one being 15,000 feet in length. It is divided into three parts; one for horsemen, one for pedestrians, and the broad road between them for carriages; and is by far the gayest place in Vienna. Altogether the Prater is so extensive and so beautifully laid out, that it is considered one of the finest public parks in Europe. Near it is another open spot of a humbler description, called the Würstel Prater, covered with innumerable liquor shops, Russian swings, roundabouts, jugglers, and all sorts of diversions for the lower classes, who, on Sundays and holidays in the afternoon, repair thither in throngs. Adjoining the Prater is the Augarten, and next to that the Brigittenau, which are very agreeable walks, but not so frequented as the Prater. The Viennese are exceedingly fond of amusements, especially music, and the pursuit of pleasure seems one of the main occupations of the great mass of the people. The city is said to contain more places of amusement than any other capital in Europe.

Great lines of railway extend from Vienna N.N.E. to Warsaw; N.W. through Prague, Dresden, and Berlin to Hamburg; E. through Pesth, to Debreczin; and S.S.W. to Trieste.

The situation of Vienna must be very unhealthy. Either from that or some other cause, the annual death rate is extraordinarily high, being not less than forty-nine per 1000 per annum, or more than double that of London.

Vienna appears to have been a Roman station in the first century, and to have borne the name of Fabiana. It was afterwards included in Upper Pannonia, and received the name of Vindobona. On the decline of the Roman empire it experienced the common fate, and was pillaged by the Goths and Huns. At a later period it formed part of the empire of Charlemagne, who erected it into a bishopric, and contributed much to its prosperity. Under him it became the capital of a margraviate, and the surrounding territory received the name of Austria, or Oester-reich, 'the Eastern Kingdom.' Its first margraves were princes of the Babenberg family, who afterwards changed their title to that of dukes, and continued to rule till the thirteenth century, when the line became extinct. Vienna then came into the possession of Ottokar of Bohemia. By him it was greatly increased in extent, and improved in appearance; but in consequence of his refusal to acknowledge the election of the Emperor Rudolph, was subjected to a six weeks' siege. Not long after it passed, with Austria itself, to the house of Hapsburg. In 1484 Matthias, king of Hungary, gained possession of it, and made it the seat of his court. Under the Emperor Maximilian I. it became the capital, and has ever since been the habitual residence of the

head of the Austrian dynasty. In 1529 a host of Turks, mustering 120,000 men, and 300 pieces of cannon, and headed by Solyman the Magnificent, appeared before the walls, burned the suburbs, and battered down a great part of the city; but the defence, though conducted by only 16,000 regular troops and 4000 citizens, was so valiant that the assailants were forced to retire. Before the disasters which they had caused were thoroughly repaired, the plague visited the city in 1676, and carried off 120,000 persons in eleven months. In 1683 the Turks re-appeared, with a still more formidable host than before, commanded by the grand-vizier Kara Mustapha. The defence was most valiantly conducted for two months by Count Rudiger, of Starhemberg, but had become almost hopeless when the celebrated John Sobieski [SOBIESKI] suddenly appeared with his Poles, and the Turkish host was almost annihilated. A long period of rest and prosperity followed. The French took it in 1806 and in 1809. The Congress of Vienna, which fixed the present limits of many of the countries of Europe, was held here from November, 1814, to June, 1815. The city was held by the revolutionary party for a short time in 1848; the barricades were raised on the 6th October, but it was surrendered to the imperial troops on the 30th of the same month, having suffered severely from a bombardment. Six miles E. of Vienna is Wagram, celebrated for the defeat of the Austrians by the French, under Napoleon I., in 1809.

VIENNA, TREATIES OF. Owing to the important share which Austria has always taken in the great wars of Europe, Vienna, her capital, has been very frequently chosen as the rendezvous of plenipotentiaries and diplomatists bent on 'composing strife' and securing peace, and several treaties of historic interest and value have here been concluded. We may enumerate the following:—

April 30, 1725.—Between the Emperor Charles VI. and Philip V. of Spain. The former agreed to assist the latter in attempting the recovery of Gibraltar from Great Britain, and to support the Pretender (Prince James Edward) in ousting George I. from the British throne.

March 16, 1731.—George II., of Great Britain, and the United States of Holland, made themselves parties to the so-called 'Pragmatic Sanction,' which guaranteed the Austrian possessions to Maria Theresa, queen of Hungary. This treaty, in 1756, embroiled England in the great European struggle, known as the SEVEN YEARS' WAR, in which Austria was supported by Russia and France, against Prussia, assisted by England.

November 18, 1738.—Louis XV., of France, in like manner became a party to the Pragmatic Sanction, in consideration of the surrender, after the death of Stanislas, ex-king of Poland, of Lorraine and Bar to France. The stipulations of this treaty were quickly broken by the French government.

October 14, 1809.—After the disastrous battle of Wagram, Austria was compelled to resign to France Friuli, Trieste, Carniola, and portions of Croatia, Carinthia, and Dalmatia, the whole to be formed into the government-general of Illyria, and attached to the (French) kingdom of Italy; Upper Lusatia was ceded to Saxony; Western Galicia, with Cracow, Zamocz, and a share in the salt mines of Wichiza, to the grand duchy of Warsaw; and Eastern Galicia to Russia. Austria thus lost the entire Adriatic coast, her rank and resources as a naval power, and a territory of 58,170 square miles, with a population of 3,500,000.

June 9, 1815.—This was the result of the deliberations of the famous Congress of Vienna, which assembled, after the downfall of Napoleon, to settle the affairs and regulate the subdivision of Europe. It was attended by about 500 representatives of the European powers. Austria was represented by Prince Metternich; Great Britain, by Lord Castlereagh, and afterwards by the duke of Wellington; France, by Prince Talleyrand; Prussia, by Count Hardenberg; and Russia, by Count Nesselrode. The affairs of the congress were virtually settled by a council within the council, a kind of private committee, attended only by the representatives of Great Britain, Austria, Prussia, Russia, Spain, Portugal, and Sweden. The first meeting was held September 20, 1814. The chief points settled by this important congress, whose principal conclusions remained undisturbed for half a century, were:—The restoration of her losses to Austria, of Savoy to Piedmont, and of Hanover to Great Britain. France was remitted to her former boundaries; Norway was annexed to Sweden; Belgium and Holland formed into one kingdom (that of the Netherlands). The free navigation of the Rhine was established, and the ancient constitution of Switzerland restored. Genoa was incorporated with Sardinia; Prussia obtained Swedish Pomerania, and the greater part of the left bank of the Rhine. The settlement sanctioned by the congress was afterwards disturbed in two points; Belgium threw off the yoke of Holland, and her independence was recognized by England; Russia, Prussia, and Austria divided Poland amongst themselves, contrary to the stipulations which had provided for the erection of the latter into a kingdom attached to Russia, as Hungary is to Austria. Recent events have completely disarranged the map of Europe, and the Treaty of Vienna is no longer worth the parchment upon which it was inscribed.

VIENNE, a department in France, formed out of part of the old province of Poitou, is bounded N. by Maine-et-Loire and Indre-et-Loire, E. by Indre, S. by Haute-Vienne and Charente, and W. by Deux-Sèvres. Its greatest length is 80 miles; its greatest breadth, 51 miles. The area is 2700 square miles, and the population in 1861 was 322,028.

Physical Aspect.—It has no very elevated land; the Gâtine hills, which extend from the mountains of Auvergne towards the mouth of the Loire, cross it in the S.W.; and a branch from these stretches towards the N.E. between the Clain and the Thoué, subsiding, however, into the valley of the Loire before reaching the northern boundary. The central part, between the Clain and the Vienne, consists of tolerably high ground; but the part E. of the latter river is low.

Hydrography.—The department belongs to the basin of the Loire, except the S.W. corner, about Civray, which is drained by the Charente. The *Vienne*, which is one of the principal affluents of the Loire, rises in Corrèze; after crossing Haute-Vienne and a part of Charente, it enters Vienne on the S., just above Availles, and flowing northwards, quits it below the junction of the Creuse. This river is navigable for about 40 miles from the point where it receives the Clain to its entrance into the Loire in Indre-et-Loire. Nearly all the other streams are tributaries of the Vienne, but not one of them is navigable except the CREUSE. The *Clain* rises in Charente, but has nearly the whole of its course of more than 60 miles in Vienne. It passes Poitiers and Vivonne. The *Dive*, a tributary of the Thoué, a feeder of the Loire, rises in this department, and has the greater part of its course on the western border. The Charente just crosses the south-western angle.

Soil and Products.—The area is 1,700,000 acres, of which more than 1,000,000 are under the plough. The

most productive soils are in the north; those in the south and south-east are generally poor. The principal productions are wheat, maize, millet, rye, oats, hemp, lint, flax, sainfoin, lucern, peas, and potatoes. In general, however, agriculture is in a very backward state. A great number of fine horses, mules, horned cattle, sheep, goats, and pigs are bred; and poultry is abundant. The vineyards occupy a considerable extent of land, and yield white and red wine of ordinary quality. The woods cover above 200,000 acres, and waste and barren lands nearly as much. A large quantity of walnuts, chestnuts, (which form an important article of food for the poorer inhabitants), besides various kinds of fruit, are grown. The climate of the department is mild, but changeable, and is generally healthy.

Iron is abundant; and there are many quarries for millstones, whetstones, lithographic stones (which are finer and harder than those of Munich), limestone, freestone, and marble, which takes a good polish. At La Roche Posay are sulphureous mineral waters. The principal manufacture is that of arms and cutlery at Châtelherault; but the inhabitants are also employed in making coarse woollens, serge, lace, hosiery, cutlery, bleached linen, hemp, leather, and paper. A good trade is carried on in the varied products of the soil, and of the industrial activity of the population—particularly in hardware and cutlery, both of which are excellent in quality and enjoy a wide reputation. The line from Orleans to Bordeaux, with its branches and connections, affords good railway accommodation.

Divisions, Chief Towns, &c.—The department is divided into five arrondissements, which, with their subdivisions and population, are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1861.
Poitiers, . . .	10	83	113,971
Châtelherault, .	6	51	60,743
Civray, . . .	5	45	49,325
Loudun, . . .	4	57	35,567
Montmorillon, .	6	60	62,422
Total, . . .	31	296	322,028

The capital of the arrondissement of Poitiers, and of the whole department, is POITIERS. *Lusignan*, 14 miles from Poitiers, on the road to Rochefort, was formerly famous for one of the strongest feudal castles in France, very little of which now remains. This town is also remarkable as being the cradle of the Lusignan family, who were sovereigns of Jerusalem and Cyprus during the Crusades. Its population is now about 2500, who carry on an important trade in corn, seeds, and mules. *Mirebeau*, 16 miles N. by W. from Poitiers, also once famous for its castle built by Foulques Néra, in which Eleanor, widow of the English Henry II., was besieged in 1202, has 2719 inhabitants. *Neuville*, 8 miles N.W. from Poitiers, has a population of 3310. *Vivonne*, 12 miles by railway S. from Poitiers, has a corn-market, manufactures of coarse woollens, and a population of 2618. *Vouillé*, a small village, 10 miles W. from Poitiers, on a feeder of the Clain, has given name to the great defeat of the Visigoths by the Franks under Clovis in 507.

The arrondissement of Châtelherault is named from its only large town, *Châtelherault*, which stands on the right bank of the Vienne, 20 miles N.E. by railway from Poitiers, and has 14,210 inhabitants, who manufacture excellent cutlery, jewellery, linen, hardware, lace, side-arms, &c. The old fortifications are now replaced by handsome residences and pretty promenades. A fine stone bridge joins the town to the suburbs on the left bank of the Vienne. A large mansion, flanked by four massive towers, stands at one end of the bridge, and forms a gate entrance, the high road passing under a lofty arch in the centre of the building. Châtelherault is in general ill built; the most remarkable structures are the Gothic church of St. Jean, the tower of the church of Notre-Dame, the theatre, the imperial factory of arms, the exchange, hospital, and public fountain. The town is the seat of civil and commercial tribunals, a communal college, and a chamber of agriculture. It is at this point that the Vienne first becomes navigable; and the river port is the centre of an active trade in wines, dried fruits, brandy, millstones, iron, steel, grain, and all kinds of agricultural produce. The Scotch duke of Hamilton takes his title of Duc de Châtelherault from this place. It was first bestowed by Henry II. of France upon James Hamilton, second earl of Arran, and regent of Scotland, in 1548, to induce him to consent to the projected match between his ward, the infant Queen Mary, and the Dauphin Francis. The right to the honour has been recently confirmed to the present duke by the Emperor Napoleon III., in opposition to the claim of the marquis of Abercorn.

The chief town of the arrondissement of Civray is *Civray*, which is situated in a fertile territory, 30 miles S. from Poitiers, on the right bank of the Charente, and has a parish church of great antiquity, a civil tribunal, a college, and 2304 inhabitants, who manufacture woollen stuffs, and trade in corn, truffles, chestnuts, seeds, and cattle. *Availles*, 17 miles E. of Civray, on the left bank of the Vienne, has mineral springs, and 2070 inhabitants.

Loudun, the chief town of the arrondissement of Loudun, stands on the slope of a hill, above an extensive plain, 32 miles N. by W. from Poitiers, and has a civil tribunal, a college, and 4504 inhabitants. It is a large town, with wide streets and spacious houses. On the site of the ancient castle, of which only a single tower remains, a handsome promenade has been formed. Woollen cloth, linen, lace, jewellery, and leather are the chief industrial products; there is also a good trade in corn, seeds, white wine, brandy, oil, hides, dried fruits, flax, hemp, &c. Loudun is celebrated for the synod held in it by the Protestants in 1611 and 1612. There is no other large place in the arrondissement.

The arrondissement of Montmorillon is named from its only important town, *Montmorillon*, which is built in a pretty situation on the Gartempe, a feeder of the Creuse, 27 miles S.E. from Poitiers, and has a civil tribunal, a secondary ecclesiastical school, linen bleach mills, and 5130 inhabitants, who manufacture biscuits, macaroni, and paper. This place was formerly defended by walls and a castle, which were demolished by the prince of Conti. The famous hospital of Maison-Dieu, founded here towards the end of the eleventh century, by Robert du Pui, for the benefit of the sick and poor, was very richly endowed: it was managed by Augustinian monks from 1613 till the first Revolution, when the property of the hospital was seized, and the buildings sold. The latter, which are spacious, of very curious construction, and contain several groups of strange unexplained allegorical figures, were purchased by the diocesan board for the purposes of a theological seminary.

The department is united with that of Deux-Sèvres to form the see of the bishop of Poitiers; it is included

in the jurisdiction of the Imperial Court and Academy of Poitiers; and is in the eighteenth Military Division, the head-quarters of which are at Tours. It returns three deputies to the Corps Legislatif. (*Dictionnaire de la France; Annuaire pour l'An* 1868.)

VIENNE, HAUTE (*Upper Vienne*), a department in France, formed out of upper Limousin, part of lower Marche, and a few districts of upper Poitou, is bounded N. by Vienne and Indre, E. by Creuse, S. by Corrèze and Dordogne, and W. by Charente. Its greatest length is 60 miles, and its greatest breadth 50. The area is 2140 square miles, and the population in 1861 was 319,595.

Mountains and Rivers.—The heights of Gâtine, extending from the great mountain group of Auvergne toward the mouth of the Loire, separate the basin of that river from those of the Garonne and the Charente, and cross the southern part of Haute Vienne in a direction nearly from east to west. Mount Jargeau, the most elevated point on this chain of hills, is about 3114 feet high. Another range, nearly parallel to these, crosses the centre, separating the valley of the Vienne from that of the Gartempe. The most elevated point here is Le Puy le Vieux, 3196 feet high. The mountains have generally round peaks; few steep or craggy summits appear. They are highest in the E., and slope gradually to the W. On the top they are almost destitute of vegetation, but as they descend, are covered with birch and pine, and ultimately with extensive forests, containing great numbers of chestnut trees. The other parts of the department are for the most part level.

The department is chiefly included in the basin of the Loire; but the southern slopes of the Gâtine heights belong to those of the Charente and the Garonne. Of the tributaries of the Loire, the Vienne crosses from E. to W. into Charente, after receiving several small feeders on both banks. The Gartempe, a tributary of the Creuse, which drains the northern part: the Briance, and the Taurion, are the names of the other principal streams. Not one of the rivers is navigable. Ponds are numerous, but small. There is good railway accommodation between all the principal towns.

Climate, Soil, &c.—Owing to the general elevation of the surface, the climate is colder than the latitude would indicate. The average temperature of Limoges is lower than that of Paris, though it is 5° further S. The atmosphere is moist and the weather changeable.

The area of the department is 1,369,670 acres, of which only about 533,000 acres are under the plough; and of this but a small portion is fit to grow wheat. A considerable quantity of rye, buck-wheat, beans, and peas is raised; the growth of corn is, however, insufficient for the support of the inhabitants: the deficiency being made up by the abundance of chestnuts. The meadow and grass lands amount to above 320,000 acres, besides 230,000 acres of heath or other open pasture; and grazing forms the most important branch of agricultural industry. The hay is excellent, but the artificial grasses are not much known. A great number of mules, of horses of the esteemed Limousin breed, and of horned cattle and sheep, are reared. Horse races and a cattle show are held yearly at Limoges, and prizes distributed. Pigs are numerous. The vineyards are not very extensive, but yield a large quantity of indifferent red wine. Hemp is much cultivated. About 90,000 acres are occupied with woods, chiefly in small clumps or in copses; chestnuts and walnuts are grown in great abundance, and there is a considerable quantity of oak timber. One-sixth of the entire area is absolute waste. Game is plentiful, and wolves, foxes, wild boars, and badgers, are found in the forests. A great number of bees are kept. Iron, copper, tin, lead, antimony, and coal mines are worked. Porcelain clay, including an excellent seam of kaolin, which is largely employed in the porcelain works in the neighbourhood of Paris, and granular felspar are obtained. Good granite and other building stone and limestone are dug. Iron is the most important manufacture, and there are many blasting furnaces, steel, and other iron works; after which cutlery, coarse cloth, druggets, flannel, blankets, linen, cotton yarn, leather, paper, glass, porcelain, and pottery, are the chief industrial products.

Divisions, Chief Towns, &c.—The department is divided into four arrondissements, which, with their subdivisions and population, are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1861.
Limoges, .	10	80	147,009
St.-Yrieux, . .	4	26	43,137
Bellac, . . .	8	65	79,866
Rochechouart, .	5	30	49,583
Total, . . .	27	201	319,595

The capital of the arrondissement of Limoges and of the whole department, is LIMOGES. *Aixe*, a small town of 3119 inhabitants, who are chiefly employed in making bricks and tiles, is 7 miles S.W. from Limoges, on the Vienne. It was formerly famous for its feudal castle, which has long since disappeared, and part of the site is now under tillage. *Ambazac*, 10 miles N.N.W. from Limoges, has an iron-wire factory and 2925 inhabitants. *Eymoutiers*, 26 miles E. by S. from Limoges, in a wild picturesque valley on the Vienne, has a population of 3572. *St. Léonard*, the ancient *Nobiliacum*, an old town of 6196 inhabitants, is situated 11 miles E. from Limoges on the right bank of the Vienne, here crossed by a handsome bridge. It stands on a slight eminence above the river; and is surrounded by boulevards, which occupy the site of the old fortifications, and are shaded by fine trees. The church, founded in 1062 and repaired in 1484, is the most remarkable building. Coarse woollens, blankets, porcelain, woollen yarn, copper ware, leather, and paper, are the chief industrial products.

The arrondissement of St.-Yrieux is named from its chief town, *St.-Yrieux*, which stands 25 miles S. from Limoges, on the left bank of the Loue, a feeder of the Isle, one of the tributaries of the Dordogne, and has a civil tribunal, a communal college, and 7613 inhabitants. It is ill built, but contains a remarkable church of the thirteenth century, and near it a high battlemented tower, built in the eleventh century to command the abbey of *St.-Yrieux*, to which the church belonged. Porcelain, linen, pottery, hides, iron and brass goods, candles, cloth, flannels, hemp, and cattle enter into the trade of the town. *Chalus*, 15 miles N.W. from St.-Yrieux, near the source of the Tardoire, has 1987 inhabitants. *St.-Germain-les-Belles*, 18 miles N.E. from St.-Yrieux, has a population of 2128.

In the arrondissement of Bellac the chief town is *Bellac*, which stands on the slope of a steep hill above the Vinçon, a feeder of the Gartempe, 24 miles N. by W. from Limoges, and has a civil tribunal, manufactures of linen, paper, woollen cloth, blankets, hats, and leather, and 3633 inhabitants. Not far from the town there is

a druidical monument consisting of five immense stone blocks surmounted by an enormous slab. The court-house and guard-house of Bellac are formed out of a portion of the old castle built by Boson le Vieux in the tenth century. *Bessines*, on the left bank of the Gartempe, population 2590; *Châteaux Ponsat*, also on the left bank of the Gartempe, population 3827; *Le-Dorat*, 6 miles N. from Bellac, prettily situated on the Sèvre, a feeder of the Gartempe, with a spacious church of the tenth century, and 2604 inhabitants; and *Magnac-Laval*, 5 miles E. of Le-Dorat, with a population of 3351—give names to cantons.

The arrondissement of Rochechouart is named from its chief town, *Rochechouart*, which is situated on the slope and at the foot of a rocky hill above the Grenne, a small feeder of the Vienne, 22 miles W. from Limoges, and has a civil tribunal and 4194 inhabitants, who manufacture vinegar, glass bottles, tiles, and bricks. The summit of the rock was covered with a strong old castle now partly in ruins; it is surrounded by walls flanked with towers, the largest of which serves for a prison. There are ironworks in the neighbourhood. *St.-Junien* is built on the slope of a hill which stands in the fork between the Vienne and its feeder the Glane, 7 miles N.E. from Rochechouart, and has a departmental school and 6795 inhabitants. The town is surrounded by boulevards planted with fine trees and affording a rich and varied prospect. The parish church, classed among French historical monuments, and dating from the thirteenth century; and the chapel of Notre-Dame, situated close to the bridge over the Vienne, are the most noteworthy structures. The inhabitants carry on active manufactures of serge, blankets, quiltings, cotton and woollen stuffs, hats, leather gloves, pottery, porcelain, paper, leather, &c. Many mules are bought and sold here. *Oradour-sur-Vayres*, a large village situated 6 miles S. from Rochechouart, at the foot of a hill which separates it from the right bank of the Tardoire, has 3310 inhabitants.

This department and that of Creuse form the see of the bishop of Limoges; it is included in the jurisdiction of the Imperial Court of Limoges and Academy of Poitiers, and is in the twenty-first Military Division, the head-quarters of which are at Limoges. It returns two deputies to the Corps Legislatif. (*Dictionnaire de la France; Annuaire pour l'An* 1868.)

VIENNE. [ISÈRE.]

VIETA, FRANCIS, was born near La Rochelle in 1540, passed his life in high public situations, and died in 1603. He was in one sense, what he has been called, the inventor of algebra, by the systematic introduction of symbols to stand for quantities, both known and unknown. His collected works were published in 1640.

VIGA GANITA and LILIWATI. The names of two Hindu works, the first on algebra, the second on arithmetic, written by Bhascara Acharya, in the twelfth century. They are our principal sources of information on Hindu mathematics.

VIGNETTE, a small decorative engraving, which has no complete background, nor defined boundary, and is used in printing for the illustration of a page of any work. In photography, it designates a portrait which only gives the face of the sitter.

VIGNY, ALFRED VICTOR, COUNT, an eminent French novelist and poet, was born at Loches, on the 27th of March, 1799. He was sent to a school at Paris, where, however, he so soon became inoculated with the war fervour of his companions (it was then the days of Napoleonic triumphs), that his mother deemed it advisable to reclaim him home. A domestic breeding did not quench his military aspirations, and at the age of sixteen he persuaded his parents to obtain him a commission in the king's regiment of musketeers. He attended Louis XVIII. in his flight to Ghent, when Napoleon returned from Elba. In 1823 he exchanged into the line that he might see something of active service in Spain; but his regiment was detained in the Pyrenees, and his enforced leisure he devoted to poetical composition. The new passion absorbed him so thoroughly that in 1828 he quitted the army, and gave himself up entirely to literary pursuits. Two years previously he had published his admirable romance of 'Cinq Mars,' which is almost as well known in England as in France. In the year 1832 he produced 'Stello, or the Blue Devils,' and in 1835, the novel of 'Military Servitude and Greatness.' His play of 'Chatterton' was also exceedingly successful. In 1845 he became a member of the Institute. He died in 1863.

VIGO. [GALICIA.]

VIGORS, NICHOLAS AYLWARD, was born in 1787, at Old Leighlin, in the county of Carlow. He became a student at Trinity College, Oxford. In 1809 he had an ensigncy purchased for him in the Grenadier Guards, and was present at the action of Barossa, in 1811, where he was severely wounded. On his return to England he quitted the army, and devoted himself to the study of zoology, especially of birds and insects. In both these subjects he acquired great knowledge, and formed extensive collections, which he at a subsequent period presented to the museum of the Zoological Society. On the death of his father he succeeded to the family estate, and in 1822 became the representative in Parliament of the borough of Carlow, for which, or for the county of Carlow, he continued to sit until his death, October 26, 1840.

Mr. Vigors contributed a large number of valuable papers to the 'Transactions' of the Linnæan Society and of the Zoological Society, and the pages of the *Zoological Journal*. He was one of the founders of the Zoological Club of the Linnæan Society, whence sprung the Zoological Society, of which he was the first secretary, and throughout the whole of his life he devoted much of his time and talents to its interests.

VILAINE. [ILLE-ET-VILAINE.]

VILL. [TOWN.]

VILLAFRANCA. [VERONA.]

VILLARS, LOUIS HECTOR, MARSHAL, was born at Moulins in 1653. He served first in Holland as a volunteer in the corps commanded by Louis XIV. His courage and activity, and perhaps his fine figure, obtained for him a troop of horse at the age of nineteen.

The next two years he served in Germany under Turenne. The mingled good sense and gallantry which he showed at the battle of Sénef procured for him a regiment of cavalry in 1674. Till the peace of Nimeguen, in 1678, he served with much distinction in Flanders under the maréchal de Luxembourg, and in Alsatia under the maréchal de Créqui. Soon after the peace of 1678 he was sent to Vienna to condole with Leopold I. on the death of the empress-mother. While here he succeeded in detaching the elector of Bavaria from the Austrian interest. Villars accompanied him on his return to Munich, and followed him into Hungary, where he assumed the command of the Bavarian contingent in the imperial army levied against the Turks. On his return to Munich he found he had lost his influence with the elector, and was obliged to leave his court. He did not, however, lose his favour with Louis,

and in 1688, on the eve of the war occasioned by the league of Augsburg, was appointed commissary-general of the cavalry.

After an unsuccessful attempt to regain his old ascendancy over the elector of Bavaria, Villars was next appointed to command the cavalry of the maréchal d'Humières, whose army was stationed in Flanders. In 1689 he was created Marèchal-de-camp. During the following two years he commanded a body of 15,000 men, which formed a reserve to the maréchal de Luxembourg. He was subsequently sent to the Rhine to assist with his counsels the maréchal de Joyeuse, who was hard pressed by the prince of Baden. In this service he continued till the peace of Ryswick in 1697.

The intrigues which preceded the Spanish War of Succession were now in full vigour. In 1699 Villars was intrusted with the delicate mission of ambassador-extraordinary to Vienna. He spent three years at that court, during which period he rendered most essential services to his master.

On the commencement of hostilities in 1701 Villars served for a short time with the army commanded by Villeroi in Italy. He was next with Catinat, when he was appointed to the army of Germany. The events of his campaign in Germany in 1703, when he was sent at the head of a large force to disengage the elector of Bavaria, who was surrounded by Austrian troops, are faithfully portrayed in his correspondence with the elector, Louis XIV., and his minister-at-war, and the letters of the general officers under his command, published at Amsterdam in 1762. The French general was everywhere successful, but the imbecility of the elector of Bavaria neutralized all his victories. Disgusted with his position, Villars obtained his recall. The next charge with which he was intrusted was to terminate the war of the Cévennes. This he accomplished in a manner at once most creditable to his courage and humanity, and peace was restored to the province, notwithstanding the intrigues of foreign emissaries, and the insincerity of the French court itself.

From 1705 till 1714 the life of Villars was a succession of campaigns. Sent by the king in the former year to inspect and strengthen the defences of the eastern frontier, his masterly encampment at Fronsberg caused Marlborough to retire with his 110,000 men; and this was no sooner done than Villars, resuming the offensive, burst into Alsatia, forced the lines of Weissenburg, presented himself before Lauterburg, crossed the Rhine between Fort Louis and Strasbourg, and laying the whole country between the river and the Schwarzwald under contribution, closed the campaign of 1705 in triumph. In 1706 he took Lauterburg and Hagenau. This success was neutralized by his loss of the battle of Ramillies in Flanders, and the minister Chamillard's withdrawal of some of his best troops. In 1707 Villars crossed the Rhine; forced the lines of Stollhofen, May 23; established his head-quarters at Rastadt on the evening of the same day, and the next occupied Stutgard. Troops were again withdrawn from him, and he was obliged to re-cross the Rhine. In 1708 he was sent to command on the frontier of Savoy, but the campaign terminated without effect. In 1709 he was despatched to re-organize the dispirited and demoralized army of Flanders. At the battle of Malplaquet he was wounded early in the day, and compelled to remain inactive for the rest of the year. The campaign of 1710 was desultory. In the autumn his wound broke open, and he resigned for a time the command of the army. In 1711 the exhausted state of French finances kept him on the defensive within the frontier. In 171 battle of Denain, the capture of Marchiennes, and several other strongholds, restored courage French. The peace of Utrecht was concluded rately) by Holland and England in 1713. refused to agree to it; Villars was sent into G at the head of an army, and on the 7th of March extorted the treaty of Rastadt.

From 1714 to 1732 he was exclusively engaged turmoil of state intrigue, caused by the death XIV., and the enmity of the Abbés Dubois and towards him. Villars, however, retained at any outward respect of the regent, and was further pr by the affection of the young king, and the favour duke of Bourbon. This continued till 1732, wh rupture with Austria on account of the Spanish sions in Italy rendered his military services indispe In his eighty-first year he was sent to command i with the rank of maréchal-général de la France, had never been conferred on any one before him Turenne. In the campaigns of 1733 and 17 evinced all the ardour, activity, and contempt of which characterized his youth. He was take Turin on his way to France, and died June 17, 1

VILLA'RSIA, a genus of plants belonging t natural order of *Gentianaceæ*. *V. nymphæoides*, phæa, is a floating plant, a native of Denmark, Ho Sweden, Germany, Piedmont, and of Siberia. found in ditches and slow-running streams. It i a native of Great Britain, though comparatively *V. ovata*, Ovate-leaved Villarsia, is an erect growing in wet boggy places at the Cape of Good H All the species are elegant plants when in blossom, deserve a place in the garden and greenhouse.

VILLEFRANCHE. [Aveyron; Garo Haute; Rhone.]

VILLEINS, or VILLAINS (low Lat. *villani*), i feudal ages, were servants or bondmen of base condi who, like serfs, were the property of the feudal and, as such, mere appendants to the soil. They so named because they usually dwelt in *villages*, were looked upon as mere slaves, whom the lord m at any time deprive of their goods and chattels, even administer personal chastisement. *Villanage* a base tenure of land or tenements, according to w the tenant was bound to do all such services as the required; but those who thus held in villanage were necessarily villains; for this service could make no man a villain. From this system of villanage copy tenures appear to have originated; though the abu of the custom has been long discontinued. In Engl during the Anglo-Saxon period, a large part of the pe appear to have been in a servile condition, either domestic slaves or cultivators of the land. The Norm conquest did not materially alter the state of slav in England. The lands were transferred to Norm masters, and the slaves passed as part of the proper

In England a few instances of prædial servil existed till the reign of Elizabeth, and perhaps later; but by statute Charles II. the services of villa were entirely abolished. In some parts of France existed down to the revolution of 1798. The tenu unknown in Scotland. But in land held by *fee* tenure the person from whom the title is held is ca the *Superior*, and the party holding the land is ca *Vassal*. The former is said to possess the *dominium directum;* and the latter, the *dominium utile*.

VILLENEUVE. [Gard; Yonne; Lot-et-Ga onne.]

VILLENEUVE, PIERRE-CHARLES-JEAN-BAPTISTE-SYLVESTRE DE, Vice-Admiral of France, the scion of an ancient and noble family, was born at Valensoles, in the department of Basses-Alpes, December 31, 1763. He entered the navy in his fifteenth year; was a captain in 1793, and captain of division (or commodore) in 1796. He was present, in command of the rear division of the French fleet, at the battle of the Nile, and succeeded in rescuing from destruction his own ship and four others, which he carried off to Malta. This stroke of good fortune recommended him to the notice of the emperor; in 1804 he was promoted vice-admiral; and in the following year appointed to the command of the Toulon fleet, with which he made his way to Cadiz, and, joined by a Spanish squadron under Gravina, sailed for the West Indies, where he took numerous prizes. Finding himself pursued by Nelson, he repaired to Europe, but off the Azores was met by Sir Robert Calder, and a fierce contest ensued, in which the honours were carried off by the inferior British force. Villeneuve then bore away for Cadiz, where he was blockaded by Nelson; Napoleon's scheme for the invasion of England being thus completely overthrown, as the blockade rendered it impossible for the French and Spanish to effect a junction with the fleet at Brest, and obtain the command of the Channel. By a manœuvre of Nelson's the admiral was induced to believe the English fleet so diminished in number as to offer a comparatively easy prey; and, anxious to retrieve his credit with the emperor, he quitted Cadiz harbour, and fought the great and decisive battle of Trafalgar. He behaved with heroic courage, and displayed considerable seamanship, but Nelson's genius and English steadfastness overpowered him. His vessel, the *Bucentaure*, was dismasted and forced to strike, and Villeneuve was conveyed as a prisoner of war to England. In the following April he was allowed to return to France, but on his way to Paris halted at Rennes, until he could ascertain the nature of the reception awaiting him at the French court. Being informed that Napoleon had determined on his disgrace, he committed suicide, and was found dead in his bed, with six knife wounds about the region of the heart, on the morning of the 22nd of April, 1806.

VILLIERS. [BUCKINGHAM, DUKE OF.]

VILLOSE (Lat. *villus*, 'animals' long hair'), in Botany and Zoology, a term applied to any part which is thickly covered with soft flexible hairs.

VILNO or VILNA. [WILNA.]

VIMIERO, a town of Portugal, in the province of Estramadura, and near the coast, 7 miles north of Torres Vedras, famous for the defeat of the French by the late duke of Wellington, 21st August, 1808.

VINCA (from *vinco*, 'to bind'), a genus of plants belonging to the natural order *Apocynaceæ*. Five or six species have been described: they are creeping, suffruticose, or herbaceous plants, with smooth, shining, opposite leaves, and blue, purple, or white flowers, seated on solitary, axillary, alternate peduncles. They are all natives of Europe, in shady places.

V. major, the Greater Periwinkle, flourishes in the middle and southern parts of Europe, and apparently grows wild in many districts of Great Britain, but it may be doubted whether it is an original native of this island. Its flowers are of a fine purple-blue colour, and are larger than those of any other species. They appear early in spring, and continue open all the summer. This plant is well adapted for growing on the ground of shrubberies, as well as on the banks of hedgerows, or in any shady place. *V. minor*, the Lesser Periwinkle, is also a native of Europe, in the same situations as the last, and is often found in Great Britain. It varies much in the colour of its flowers, which are sometimes double. *V. herbacea*, Herbaceous Periwinkle, has flowers of a pale blue colour. It is an elegant plant, and indigenous in Hungary. *V. rosea* is an East Indian Periwinkle. It has an erect stem with twin sessile flowers. Like all the species, it may be easily propagated by cuttings or dividing the roots. It is continually in flower. It has pale flowers, and two or three varieties are known in gardens.

All the species are easily cultivated, and are very desirable plants for gardens, as they retain their leaves throughout the year.

VINCENNES. [SEINE.]

VINCENT, ST., one of the islands of the Columbian Archipelago, situated between 13° 10′ and 13° 25′ N. lat., and 61° 10′ and 61° 20′ W. long., having Barbadoes on the E., Grenada on the S., and St. Lucia on the N. It is about 100 miles from the first, and 28 from the last named island. St. Vincent is one of the most beautiful of the Caribbee group, of an oval form, 18 miles long by 11 broad. The Grenadines consist of several small islets off the southern extremity of the coast. A ridge of high volcanic hills, bold and abrupt, but well wooded, stretches through the island from N. to S., and sends off subordinate masses, which extend to the sea, and are intersected by beautiful and fertile valleys, the soil of which is unusually rich. The loftiest summit of the range is Souffrière, which is 3000 feet high, with a crater half a mile in diameter, from whose centre rises a conical hill 300 feet high, and 200 feet in diameter at the base. After a repose of nearly a century an eruption of the mountain took place in 1812. The island has several times suffered from hurricanes and slight shocks of earthquake, but it is one of the healthiest of the archipelago, although the climate is hot and humid, there being an annual rainfall of no less than 80 inches.

The principal products are sugar, rum, molasses, cocoa, cotton, and arrow-root. The value of the exports in 1865 was 147,852*l.*, of which 140,700*l.* were to the United Kingdom. The imports in the same year—consisting chiefly of cotton, linen, and woollen goods, hardware, and casks—were valued at 121,444*l.*, by far the largest part of which was received either from the United Kingdom, or from the other British West India Islands.

St. Vincent is a dependency of the government of Barbadoes, under a lieutenant-governor (with a salary of 1300*l.* a year), who is assisted by a council of twelve members, and a House of Assembly. The revenue for 1865 was 18,999*l.*, which sufficed to meet all demands and leave a respectable balance. There is no public debt. The population of St. Vincent in 1861 was 31,755, of whom about 2347 were whites. *Kingston*, the capital of the island, on the S.W. coast, has a population of about 5000. The town is regularly built, and has several substantial public edifices, comprising a large church, chapels, government house, and court-house. There is also a botanic garden. Morality is at a very low ebb in St. Vincent—not less than sixty-one per cent. of the births in 1865 being illegitimate.

St. Vincent was discovered by Columbus in 1498, at which time the natives were numerous, and they continued to be so for a long period afterwards. In 1672 Charles II. placed it with Barbadoes and some other islands under one government. The possession of the island was afterwards a matter of dispute with the

French, but it was at length yielded to the British by the peace of 1783.

VINCENT, EARL ST. [JERVIS.]

VINCETOXICUM (from Lat. *vincere*, 'to conquer,' and *toxicum*, 'a poison'), a genus of *Asclepiadaceæ*, most of whose species are natives of central and western Asia, though a few are European. The root of *V. officinale*, or Swallow-wort, an European species, was formerly much esteemed as an antidote to poisons. It has an unpleasant odour when fresh, and a pungent sour taste. It possesses purgative and emetic properties, and was formerly esteemed a powerful remedy in scrofulous and cutaneous diseases.

VI'NCI, LEONA'RDO DA, was born at Vinci in the Val d'Arno below Florence, in 1452. His father, Pietro da Vinci, was a notary. Leonardo evinced as a boy remarkably quick abilities, particularly in arithmetic, music, and drawing. Andrea Verrocchio, the painter, took him as his pupil, and soon felt so keen a sense of his own inferiority, that he gave up painting altogether. The first original picture of Leonardo's, mentioned by Vasari, was the so-called Rotella del Fico, a round board of fig-tree, upon which, having collected almost every kind of reptile, he painted from them a monster of a most strikingly horrible appearance. This painting his father sold for a hundred ducats, and it was afterwards repurchased by the duke of Milan for three hundred ducats.

Although Leonardo devoted himself enthusiastically to painting, he appears to have found time to study many other arts and sciences—sculpture, architecture, engineering, and mechanics generally, botany, anatomy, mathematics, and astronomy; he was also a poet and an excellent extempore performer on the lyre. He was not only a student in these branches of knowledge, but a master. A letter which he wrote to the duke of Milan, probably about 1483, proposing some improvements in engineering, for both peace and war, induced that prince to take him into his service, with a salary of 500 scudi per annum.

Though Leonardo devoted more time to painting than to anything else, he did not make many designs before he went to Milan. Among the few were a cartoon of Adam and Eve, for the king of Portugal, to be worked in tapestry in Flanders; and the Medusa's Head, now in the Florentine gallery. In Milan, besides performing various services for the duke, Da Vinci established an academy of arts about 1485, and formed a great school. His first public work of art was the model for a bronze equestrian statue of Francesco Sforza. When the duke went to meet Charles VIII. at Pavia in 1494, Leonardo accompanied him, and while there he studied anatomy with Marc Antonio della Torre. About 1495 he wrote a treatise upon the respective merits of painting and sculpture, and dedicated it to the duke, but it is now lost.

In 1497 he commenced his painting of the Last Supper, on a wall of the refectory of the Dominican convent of the Madonna delle Grazie. One of the best copies is that in the Royal Academy of London, made by Marco Oggioni: there are twelve old copies still extant. The demolition of the original was completed at the time of the Revolution, by some French soldiers. When the French in 1499 entered Milan, the soldiers broke up our artist's model for the statue of Francesco Sforza. After this event Leonardo returned to Florence in 1500. He was well received by Pietro Soderini, the gonfaloniere, who employed him, and assigned him an annual pension. His first great work was the cartoon of St. Anne, for the church of the Annunziata; and he executed about the same time the portrait of the Madonna Lisa, the wife of Francesco del Giocondo, now in the Louvre.

In 1502 he was appointed architect and chief-engineer to Cesare Borgia, captain-general of the pope's army; but in 1503, after the death of Pope Alexander VI., he was again in Florence, and employed by the gonfaloniere to paint one end of the council-hall of the Palazzo Vecchio. This composition, of which Leonardo made only the cartoon of a part, was called the Battle of the Standard. In 1507 Leonardo again visited Milan, and painted between that year and 1514 several portraits, and a Madonna and Child. He then went to Rome, and was introduced by Giuliano de' Medici to Leo X., who was about to employ him, but soon offended him by a want of courtesy, and perhaps still more by sending for Michel Angelo, and he therefore set out for Pavia to enter into the service of Francis I. of France, who received him with the greatest kindness and took him into his service, with an annual salary of 700 crowns. Da Vinci accompanied the king to France in 1516, but his health after he left Italy was so enfeebled that he executed little or nothing. It gradually grew worse, and he died at Amboise, May 2, 1519.

Of Leonardo's numerous treatises few have been published. The best known is that on painting, 'Trattato della Pittura,' which has been twice translated into English. His greatest literary distinction, however, is derived, says Mr. Hallam, 'from those short fragments of his unpublished writings that appeared not many years since; and which, according at least to our common estimate of the age in which he lived, are more like revelations of physical truths vouchsafed to a single mind, than the superstructure of its reasoning upon any established basis. The discoveries which made Galileo, and Kepler, and Maestlin, and Maurolicus, and Castelli, and other names illustrious, the system of Copernicus, the very theories of recent geologists, are anticipated by Da Vinci within the compass of a few pages, not perhaps in the most precise language, or on the most conclusive reasoning, but so as to strike us with something like the awe of præternatural knowledge.' The extracts alluded to were published at Paris in 1797, by Venturi, in an essay entitled 'Essai sur les Ouvrages Physico-Mathématiques de Léonard da Vinci, avec des Fragmens tirés de ses Manuscrits apportés de l'Italie.' These manuscripts were afterwards restored to Milan, where they are still preserved under the name of the 'Codice Atlantico.'

VI'NCULUM, a name given in algebra to the line, brackets, parentheses, or other symbol, by which various terms are compounded into one, or supposed to be so compounded, in order that the result may be further operated on. As in

$$\overline{a+b+c}\,x,\ (a+b+c)x,\ \left\{a+b+c\right\}x,\ \&c.,$$

which are, by the vinculum, prevented from being confounded with $a+b+cx$.

VINE. [VITIS.]

VINEGAR, a dilute acetic acid obtained by the vinous fermentation. [ACETIC ACID; FERMENTATION.] In countries which produce wine, vinegar is obtained from its acetous fermentation; but in this country it is usually procured from malt, and the process employed resembles the first stages of the brewer's operations. [BREWING.] The malt is ground and mashed with hot water. The wort, after being cooled, is transferred to the fermenting tun, where by the addition of yeast it undergoes the acetous fermentation; and when this is over the liquor is transferred to small vessels, which are kept warm by

means of a stove: in these it remains for a shorter or longer period, according to the temperature of the stove and the strength of the liquor. The process of acetification is assisted by introducing into the casks with the wort what is called *rape*, which is a quantity of the residuary fruit which has served for making domestic wines, or has been preserved by the vinegar-maker from one process to another in his own factory. The use of the rape is to act as an acetous ferment, and thus induce sourness in the wash, it being well impregnated with vinegar and continually kept sour. Acetification is sometimes carried on by transferring the wort, after it has undergone the vinous fermentation, into casks, the bungholes of which are left open and loosely covered with tiles; the casks are then exposed for a long time to the air; but the use of stoves has greatly superseded this mode, has abridged the time of the operation, and rendered it less liable to failure. The vinegar, after it has reached its greatest degree of sourness, is rendered clear and fit for use either by subsidence or the employment of isinglass.

Vinegar may be prepared in small quantities from the fermentation of a solution of sugar mixed with yeast; or it may be obtained by the fermentation of various fruits; thus the juice of good apples contains a sufficiency of sugar to afford tolerably good vinegar without any addition. The Vinegar Plant (*Penicillium glaucum*), a well-known fungus, is also employed for the same purpose.

In France vinegar is made from poor wine; and there are two kinds—the white, prepared from white wine; and the red, by the acetification of the red wine: these are finer flavoured and somewhat stronger than the malt vinegar of this country.

Medicinal Properties of Vinegar.—Vinegar produces very different effects according to its degree of concentration; its effects are also different on the dead and living organic tissues. It acts as an effectual preservative from the putrefactive fermentation of dead organic tissues, and is hence employed as the means of forming pickles, or meat in a dried state, by simply immersing the substance in it for a few minutes. Wood vinegar, or pyroligneous acid, is most efficacious for this purpose, owing to the creasote present in it. Crude pyroligneous acid is one of the most effectual applications to timber, both to prevent the dry-rot and the ravages of insects. Concentrated acetic acid acts on the living tissues as a caustic poison; applied to the skin it causes heat, redness, and rapid inflammation. The same is the case when taken into the mouth or applied to any mucous membrane, which it blackens like sulphuric acid. When properly diluted and used in moderation, it heightens the vitality of the stomach and greatly promotes the digestive powers.

Vinegar imported into the United Kingdom is subject to a customs duty of 3*d.* per gallon. The quantity received in 1866 was 51,749 gallons—nearly all from France—valued at 2*s.* per gallon. In the same year 431,796 gallons, value 39,252*l.*, were exported.

VINER, CHARLES, died June 5, 1756, at his house, Aldershott, Hampshire. When or where he was born has not been recorded. He was the compiler of a 'General and Complete Abridgment of Law and Equity, 24 vols. folio, 1741–1751. This stupendous work was reprinted in 24 vols. royal 8vo, 1792–1794, and was followed by six supplemental volumes, royal 8vo, 1799–1806.

He was also the founder of the Vinerian Professorship of Common Law in the University of Oxford, for which purpose he bequeathed by his will, dated December 29, 1755, about 12,000*l.* to the chancellor, master, and scholars of the University of Oxford, to establish a professorship, and to endow such fellowships and scholarships of common law in the university as the produce of his legacy might be thought capable of supporting. The professor is to read a lecture in the English language within a year after his admission, and a course of lectures on the laws of England every year in full term. The course is to consist of at least twenty-four lectures, to be read in one and the same term, with such intervals that not more than four are to be read in a week. As relates to the reading of the lectures, Easter and Trinity Terms are reckoned as one term. There are at present two fellowships of 50*l.* a year each, and five scholarships of 30*l.* a year each. They are tenable for ten years. Blackstone, the author of the 'Commentaries,' was the first Vinerian professor.

VINET, ALEXANDRE RODOLPHE, a distinguished Swiss divine and critical historian, was born at Lausanne, June 17, 1797, and ordained a minister of the Protestant church in his native city in 1819. At the age of twenty he was appointed professor of French language and literature in the gymnasium of Basle, a post which he held with much reputation until 1837. In 1845 he took an active share in the establishment of the Free Church of Vaud, which in a great measure owed its origin to his eloquent denunciations of the union between church and state. He closed a blameless life at the early age of fifty, May 18, 1847. His principal works are:—'Histoire de la Littérature Française au XVIII. Siècle;' 'Études sur la Littérature Française du XIX. Siècle;' 'Nouveaux Discours;' 'Études sur Blaise Pascal;' and 'Études Evangéliques.' Some of his writings have been translated into English, and have met with a favourable reception. They are eloquent, generous, evangelical, and earnest. As a critic his judgments are entitled to the greatest respect.

VINGT-UN, a French round game at cards, depending on the number of pips in the cards dealt to each player. In reckoning these, the ace counts either as one or eleven, according to the player's choice; the court cards as ten each; and the others according to the number of the pips. The object is to obtain the highest number, not exceeding *twenty-one*, whence the name.

VIOL (Ital. *viola*), an ancient musical instrument, which may be considered as the parent of all modern pieces of the violin family. It was known as early as the eleventh century. It was a fretted instrument, of three sorts—treble, tenor, and base, each furnished with six strings, and played on by a bow. The treble viol was rather larger than our violin, and the music for it was written in the treble clef. The tenor viol was in length and breadth about the size of the modern viola, but thicker in the body, and its notation was in the soprano or C clef. The base viol scarcely differed in dimensions from our violoncello: the music for it was written in the base clef.

VIOL DA GAMBA was the last survivor of the family of viols. It derived its name from being held between the legs, as the smaller viols were called *viol da bracchio*, &c., because held with the arms. It has been superseded by the violoncello.

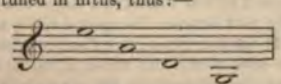
VIOLA, or TENOR VIOLIN, a larger kind of violin, to which the part between the second violin and base is assigned. It has four gut strings, the two lowest covered with silver wire, which are tuned A, D, G, and C, an octave above the violoncello. Its compass is from C in the base to G above the treble stave.

VI'OLA, a genus of plants, the type of the natural order *Violaceæ*. *V. odorata*, common Sweet Violet, is a native throughout the whole of Europe, and in Siberia and China. It is common in England, but is a rare plant in Scotland and Ireland. Wherever this plant grows, its delicious scent has made it a great favourite. *V. hirta*, the Hairy Violet, flourishes in thickets and groves throughout the whole of Europe, and is not uncommon in England, though rare in Scotland. *V. canina*, Dog's Violet, is common in Britain, and abounds in hedges, thickets, and heathy grounds throughout almost all Europe, in Japan, Persia, the north-west coast of North America, and the Canary Islands. The flowers are blue and scentless. *V. tricolor*, Three-coloured Violet, Heart's-ease, or Pansy, is a native of cultivated fields and gardens throughout Europe, Siberia, and North America. The petals vary exceedingly in colour and size, and this tendency has been taken advantage of by the floriculturist for producing varieties of this flower, and at the present day there are few flowers receiving more attention than the pansy.

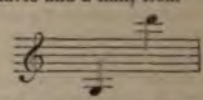
VIOLA'CEÆ, or VIOLA'RIEÆ, a natural order of plants belonging to Lindley's parietose group of polypetalous Exogens. All the *Violaceæ* possess in a greater or less degree emetic properties, which reside principally in their roots.

VIOLIN (Lat. *fides*; Ger. *fiedel*; Dutch, *vidule*; Ital. *viola* and *violini*), a musical instrument which is usually considered the most perfect and agreeable of all stringed instruments played with the bow. Some writers place its invention in the time of the Crusades, and others trace its origin to the Indian *Ravanastron*, still played by Buddhist monks, who go begging from door to door, and traditionally believed to have been the invention of Ravana, king of Ceylon, 5000 B.C. The Russian *Gondok* and the Welsh *Crwth*—the latter much used in the sixth century—both arose from the Ravanastron; one great difference between them and modern instruments of the same nature being that, instead of the bridge being arched as now used, it was flat, so that all the strings had to be sounded at once.

M. Otto says that when complete the instrument consists of fifty-eight different parts or pieces, but that such small divisions are not indispensably necessary. The principal are a wooden sonorous chest, formed of two slightly arched surfaces, known as the back and belly, united by sides or ribs, and with a curve or hollow on each side in the middle of the length; a neck or fingerboard attached to the chest; and strings, fastened at one end to the belly by a tailpiece or projection of wood, and at the other to the head or extremity of the neck, where they can be tightened or loosened at pleasure by turning pins. The strings thus passing over the belly are raised up from it by a bridge; and on the belly there are two apertures or sound-holes, in form resembling the long *f*. The wood is generally of three sorts. The back, neck, sides, and circles, of sycamore; the belly, bass-bar, sound-post, and six blocks, of deal; and the finger-board and tail-piece of ebony. The bridge is convexly curved so as to allow, in drawing the bow across the strings, of each string being sounded separately. The modern violin has four strings of gut, the last, or lowest, being covered with silver wire. These are tuned in fifths, thus:—



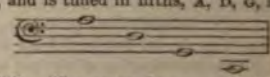
As the bow is drawn across the strings, the various sounds are produced by pressing them with the upon the finger-board, and the nearer the finger is towards the bridge, the quicker become the vib and the higher the tone. The compass of the v about three octaves and a half, from



with all the intermediate semitones. Besid almost unlimited range of sounds, this instru nearly unrivalled for the wonderful variety and of expression produced from it in the hands of a player. In orchestral music, there are alwa different parts for treble and alto, known as f second violin; and the same is generally the ca it is used in concerted music, the usual arrange stringed quartett music being for two violins, vi violoncello.

The finest violins are those of the old C makers, Jerome, Anthony and Nicholas Amat divarius, Guarnerius, and F. and T. and G. B. B Next in quality are those of Jacob Steiner, an two Klotz, father and son, Tyrolese makers.

VIOLONCELLO, a large musical instrumen violin class, held by the performer between hi It has four gut strings, the two lowest cover silver wire, and is tuned in fifths, A, D, G, and



VIOLONE. The contra-basso, or double ba largest instrument of the violin kind. It is played with more than three strings, which lie a below the violoncello. It is chiefly used to sus harmony.

VIPER. [SERPENTS; VIPERIDÆ.]

VIPE'RIDÆ, a family of venomous serpents, ing, according to some zoologists, the true Vip Cobras, and the Rattlesnakes. The Cobras co a distinct family, and have been already [NAIA.] The Rattlesnakes may be properly under the *Viperidæ*.

In Europe our common Poison-snake is the (*Vipera vulgaris*, Ray; *Vipera communis*, I This snake is subject to variations of colour, wh Mr. Bell observes, have led to the erroneous multi tion of species.

The common Viper is probably the Ἔχις (*Ech* Aristotle and the Greeks, and the *Vipera* of ('Georg.,' iii. 417), Pliny ('Nat. Hist.,' viii. 39; xi. 37), and the Romans. It is the *Mavrana* Italians; *Vipère* of the French; and *Adder* o English (anciently written *Nedre*, and later *Eddre* the loss of the initial *n*, from the Anglo-Saxon *Ne*

Geographical Distribution.—Europe generally, the north of Russia to the south of Italy and S England and Scotland, but not Ireland.

The poison of the viper, although not generally at least in our island, to man or the larger ani proves almost immediately destructive to small crea such as mice, frogs, young birds, &c., on which it u ually feeds. Open copses, dry heaths, and sandy are the favourite resort of this species. Hybe intertwined with several of its own species. Tail compared with that of the common snake. L from 18 inches to 2 feet. The number of you duced at a birth varies from twelve to twenty.

s soon as they enter into the world the true
rit.
nd Africa present us with many venomous
sides the Cobra. [NAIA.] Of these we may
he *Cerastes*, or Horned Snake. One species,
tian *Cerastes*, was well known to the ancients,
ars figured on the monumental relics of Thebes.
he snake of which Herodotus (lib. 2) speaks in
ving passage :—'There are about Thebes sacred
entirely innocuous to man; they are of dim-
ize, and have two horns sprouting from the
the head; when they die they are buried in
ple of Jupiter, to whom they are said to be
Herodotus was in error in saying that these
ere innocuous. Perhaps he had examined only
ividuals from which the poison fangs had been
l, or confounded the *Cerastes* with some truly
species. This snake was devoured by the
ris.
mith has described a new species of Cerastes
alis, *Vipera ocellata*, Smith) from South Africa.
Egyptian *Cerastes*, this snake is sluggish and
although when roused capable of exerting won-
tivity. Its seizes its prey, or enemy, holding
extreme tenacity of tooth. Sandy districts are
rite abode. Of the genus *Vipera* (including
), there are in South Africa the following
viz. :—*Vipera arietans*, *V. atropos*, *V. cor-
inornata*, *V. ocellata* (*caudalis*), *V. atropoïdes*,
atropos, *E. inornata*, *E. atropoïdes*, *Cerastes*
, and *C. ocellatus* (*caudalis*).
pers and one or two species of *Elaps* are the
kes of South Africa which permit themselves
to be closely approached without evincing any
concern. The others manifest a disposition to
e offensive or to fly. Even an unusual noise
ent, he remarks, to insure the retreat of the
s ones.
uth America and the West India Islands are
pecies of venomous serpents. In Martinico
ucia the Lance-headed Viper (*Trigonocephalus
us*) is a dreaded pest; nor less so the Bush-
Lachesis rhombeata) in Guiana and Brazil. In
the Rat-tail (*Craspedocephalus atrox*) annu-
roys several persons.
ommon Rattlesnake (*Crotalus horridus*) is
in Virginia, the Carolinas, and other parts of
It has been said to fascinate its victims.
h is that they are paralyzed by extreme terror,
before the approach of their sluggish aggressor.
reptiles, which often attain to a large size, the
rnished with a singular apparatus, consisting
mber of thin horny cells of a pyramidal figure,
rotuberant marginal ring. They are fitted into
her as far as this ring; that is, the pyramidal
f one is received into the hollow of that suc-
t, its apex reaching as far as the ring of the
d so on. Hence, when altogether, the protu-
argin of each is alone visible. The articulation
distinct portions being very loose, they rustle
ach other when smartly vibrated, and produce
t whirring noise that may be heard at some
The number of the joints of this rattle
to a certain period at least, with each moult
ough, and the basal bell is the last formed.
lence of the poison of the Rattlesnake depends
n the time of the year; it is most fatal during
r months. These dreaded reptiles often enter
arns, &c., and were they as active and mali-
cious as the Cobra, more frequent instances of the death of man from their bite would be recorded. They are not prone, unless driven to extremity, to use their weapons.

The Small Rattlesnake (*Claudisona miliaris*), and the Water Rattlesnake (*Tisiphone Shawii*), are both natives of the Carolinas. In the latter the tail terminates in a simple spine.

Australia contains several deadly snakes, the Brown Snake, the Yellow Snake, the Black Snake, and Death-adder. The latter belongs to the genus *Acanthopis*, its tail terminating in a horny spine.

VIRE. [CALVADOS.]

VIRGI'LIA, a small, chiefly tropical, genus of the large natural family of *Leguminosæ*, named by Lamarck in compliment to the poet Virgil. Several species are natives of the Cape of Good Hope.

VIRGI'LIUS, or VERGILIUS, PUBLIUS MARO, was born at Andes, a small place near Mantua, on the 15th of October, B.C. 70, in the first consulship of Cn. Pompeius Magnus and M. Licinius Crassus. He was five years older than Horace, who was born B.C. 65, and seven years older than the Emperor Augustus. He was instructed in the neighbouring towns of Cremóna and Mediolanum (Milan). It is apparent from the writings of Virgil that he had a learned education, and traces of Epicurean opinions are obvious in his poetry. When a division of lands in Italy was made among the veteran soldiers of Octavianus, Virgil lost his patrimony at Mantua (B.C. 41), but it was restored to him by Octavianus, through the intercession of some powerful friends, among whom are mentioned Alfenus Varus, Asinius Pollio, and Mæcenas. His first 'Eclogue' is supposed to allude to the loss of his lands and his recovery of them. He probably afterwards resided at Rome, and he was in favour with Mæcenas, a patron of letters, and with the Emperor Augustus. Horace attributes his own introduction to Mæcenas to Virgil and Virgil's friend Varius. The poet also spent part of his time at Naples and Tarentum. In B.C. 19 he visited Greece, where he intended to spend several years, for the purpose of perfecting his epic poem, the 'Æneid.' It was on the occasion of this voyage that Horace addressed to him one of his lyric poems ('Carm.,' i. 3). At Athens Virgil met with Augustus, who was returning from the East, and he determined to accompany the emperor back to Rome; but he fell sick at Megara, which city he visited probably on his road, and his illness was increased by the voyage to Italy. He lived, however, to reach Brundisium, where he died in the autumn of the year B.C. 19. According to his wish his body was taken to Naples, and interred on the Via Puteolana, at the second milestone from Naples. The place of his burial is still pointed out by tradition, though the so-called tomb at Posilipo cannot be considered as the monument of the Roman poet.

The 'Bucolica' of Virgil, his earliest works, consist of ten short poems, which are commonly called 'Éclogæ,' or selections, a name which may have been given them after their author's time. They were probably written between B.C. 41 and B.C. 37. They are not bucolic poems so strictly as most of those of Theocritus; some of them are merely allegorical poems in a bucolic dress. Though Virgil introduces shepherds and rustic scenery and allusions, he fails in giving to these works a genuine rustic character. There are many good lines, but the want of reality makes them cold and unmeaning. He has borrowed many passages from the Greek writers, and especially from Theocritus.

The 'Georgica,' a didactic poem, in four books,

addressed to Mæcenas, is his best work. In the first book he treats of the cultivation of the soil, in the second of fruit trees, in the third of cattle, and in the fourth of bees. The fourth book has but a meagre subject, but it is well handled, and the materials, which would have been insufficient for a book of the same length as the others, are made up by the long story of Aristæus. His taste and judgment were improved when he wrote the 'Georgica.' If the concluding lines of the fourth book are genuine, Virgil was finishing this poem at Naples about B.C. 30.

The 'Æneid' is the great national epic of the Romans. It is said to have been left imperfect, and to have been published by Tucca and Varius after the poet's death. The poem consists of twelve books, which contain the story of the wanderings of Æneas after the fall of Troy, and his final settlement in Latium after the defeat of Turnus and the Rutuli. Though the adventures of Æneas are the direct subject of the 'Æneid,' the glories of Rome and the fortune of the Julian House, to which Augustus belonged, are skilfully interwoven in the texture of the poem. The foundation of Alba Longa, and the transfer of the seat of empire from that city to Rome, are announced in the first book, by Jupiter, to be the will of the Fates; and the great family of the Cæsars is declared to be the descendant of Æneas. The adventures of the Trojan hero at the court of Dido, queen of Carthage, give occasion to hint at the future rivalry between the Romans and the Carthaginians, and the long contest which was destined to end in the triumph of the descendants of the Trojan hero. The numerous allusions to actual circumstances and to the history of the republic were adapted to create or to confirm a popular notion of the Trojan descent of the Romans. Though the 'Æneid' contains many fine passages, its poetical merits are greatly below those of the 'Iliad' and 'Odyssey.' The poem wants the unity of purpose and integrity of construction which so eminently characterize the 'Iliad,' and it is deficient in that truth and simplicity which form the never-tiring charm of both the 'Iliad' and the 'Odyssey.' But Virgil had other models besides Homer. The poets of the Alexandrine school were his study, and particularly Apollonius of Rhodes, whom he has often imitated. The 'Æneid' contains many obscure passages, and though Virgil is generally used for early instruction, he is one of the most difficult of the Roman poets. Several short poems attributed to him are printed in some editions of his works—'Culex,' 'Ciris,' 'Copa,' 'Moretum,' and 'Catalecta,' a collection of fourteen smaller poems.

The editions of Virgil are very numerous. That of P. Masvicius, Leovardiæ, 1717, 2 vols. 4to, contains the commentaries of Servius, Philargyrius, and Pierius, with very copious indexes. The edition of C. G. Heyne's Virgil, by G. P. E. Wagner, Lipsiæ, 1830, &c., 4 vols. 8vo, is the most complete. The text may be bought separate in a single volume. Conington's edition may also be strongly recommended.

The German translation of Virgil, by J. H. Voss, is very good. Martyn's prose translation of the 'Bucolics' and 'Georgics' has a good commentary. Gawain Douglas translated the 'Æneid' into Scottish verse. There are English versified translations by Ogilby, Dryden, and Trapp. Pitt translated the 'Æneid,' and Joseph Warton the 'Bucolics' and 'Georgics.' The latest translation into English blank verse is: 'The Works of Virgil translated (the first four Pastorals, the Georgics, and the first four Æneids, by the Rev. Rann Kennedy; the last six Pastorals and the last eight Æneids, by Charles Rann Kennedy),' 2 vols. 8v

But probably the finest version, for poetic
accuracy of interpretation combined, is that of
Conington, published in 1866. The metre
the octosyllabic, after the model of Sir Walter
'Marmion.' Many passages are rendered with
ing felicity, and the whole work is admirably
Superior to Dryden's in scholarly finish, it is
inferior in poetical merit.

VIRGIN ISLANDS are an extensive group
islands in the West Indies. They lie between
and 18° 50′ N. lat., and between 64° 10′ and
W. long. They extend in nearly a straight
W.S.W. to E.N.E., and occupy a space of about
in length, with an average width of 20
group consists of about 100 islands, islets, and
which probably not more than twenty-five are
and cultivated. The most eastern islands belong
British; those in the centre to Denmark and the
States; and the most western are considered
appendage of the Spanish island of Porto Rico.

The *British Virgin Islands* lie between 64°
64° 50′ W. long., and amount to about fifty in
but most of them are very small, and only
moderate extent. The largest of these islands
Anegada, Virgin Gorda, and Tortola. *Anegada*
miles long by 4 broad. It is low and of coral for
at its S.E. extremity is a dangerous reef, extend
10 miles outwards, which has, together with the
an unhappy celebrity for shipwrecks. The produce
island is scanty, and the inhabitants number on
Virgin Gorda is a rocky island, which produces
rum, tobacco, indigo, peas, and cotton. A
copper mine has also been worked. The length
island is about 9 miles, and its breadth 4 miles.
many inlets affording anchorage. It suffered
from an earthquake in 1830. *Tortola*, the most
tant of the British Virgin Islands, is about 12 m
by 2½ wide. It is a mountain mass, broken
furrowed by glens and ravines in every direction
the shores are indented with bays, harbours, and
which, together with the adjacent small rocky
shelter and anchorage for shipping. A terrific
swept over this island on the 30th October
destroying, or very much damaging, all the
and sweeping away all the stores in the island.
capital, *Road Town*, which had about 400 inhab
two-thirds of the miserable tenements were blown
the church, the hospital, the gaol, pier, school
Wesleyan chapel, and poor-house, were destroyed
great number of persons were killed. The total
tion of the British Virgin Islands in 1866 was
The revenue and expenditure are each about 20
annum, and the exports and imports average
about 20,000*l.* a year. The islands are under
tenant-governor, with a salary of 800*l.* a year
resides at Tortola; but they have their own
administration.

The islands of St. John and St. Thomas,
belonging to Denmark, were purchased by the
States in 1868. *St. John* is 8 miles long by
it is in general too mountainous to allow much
surface for culture; but it grows nearly enough
consumption of the inhabitants. At the west
tremity is the small town of St. John, which
pretty good harbour. *St. Thomas* is described
separate article. [THOMAS, ST.]

The Virgin Islands still belonging to Den
Santa Cruz, and a considerable number

Santa Cruz, or *Saint Croix*, is about 24 miles long by 8 broad, and is very fertile. It lies 65 miles E.S.E. of Porto Rico; lat. (E. point) 17° 45′ N., long. 64° 34′ W. It is generally flat — though a range of low heights follows the line of its N. shore — well watered, and fertile. The climate at times is unhealthy, the temperature varying from 54° to 72°. Earthquakes and hurricanes are frequent. Two-fifths of the island are in sugar-cane plantations, and about one-half is occupied with general crops, only a small portion remaining uncultivated. Sugar and rum are the principal products; the others are cotton, coffee, and indigo. Some cattle are reared. The population is about 42,000. The greater number of the whites are of English origin, and English is the most common language. The chief town, *Christianstadt*, is one of the best built in the West Indies; the streets, houses, churches, and public buildings, all being of respectable character. It is the seat of the governor-general of the Danish West Indies; contains about 10,000 inhabitants, and has an excellent port, defended by Fort Christiansvärn and a battery. The town has a Danish and English church and bank, and is the centre of the commerce with Copenhagen.

The *Spanish Virgin Islands* are at a short distance from the eastern coast of Porto Rico, and consist of two islands of moderate extent, Culebra and Bieque, and of several islets. *Culebra* (*Snake Island*), or *Passage Island*, is about 8 miles long by 1 broad; while *Bieque*, or *Crab Island*, is 16 miles long by 4 broad; they have very few inhabitants, and have no commercial or political importance.

The Virgin Islands, taken collectively, have two rainy and two dry seasons. The climate is liable to much fluctuation in heat and winds, and is unhealthy for Europeans. They are also subject to earthquakes, and the northern shores are exposed to a very heavy swell of the sea, called 'the ground sea.'

Besides the staple articles mentioned before, several plants are cultivated which yield occasionally articles of exportation, as ginger, turmeric, tobacco, pimento, and indigo. Roots, kitchen vegetables, and fruits, are abundant. Plantains, bananas, cocoa-nuts, castor-oil plant, tamarinds, mahogany, and fustic, are among the produce either of the fields or the forests. A few domestic animals are kept, but most of them are imported from the Spanish Main. There are no wild quadrupeds, and birds are rare. Salt is obtained from several lagoons, which dry up in summer.

The Virgin Islands were discovered by Columbus on his second voyage, 1494. Their subsequent history is little else than a series of struggles for them between the English, French, Dutch, and Spanish; and the present partition has only been settled during the present century.

VIRGINAL, a musical instrument now entirely disused. It was a keyed instrument of one string, jack, and quill, to each note, like a spinet, but in shape resembling the present small pianoforte. The compass of the virginal was from the second added line below the base to the second added line above the treble, or four octaves.

VIRGINIA, the commercial metropolis of Nevada, is situated among rocky ledges and ravines on the eastern slope of Mount Davidson, 15 miles N.N.E. of Carson city, and about 274 miles N.E. of San Francisco. It is 6205 feet above the level of the sea, in about 39° 22′ N. lat., and 119° 35′ W. long. The principal streets are level, having been in many places cut through the solid native rock. The business thoroughfares are lined with blocks of substantial stone and brick buildings, and the environs are adorned with many fine private residences. The city contains four churches, a public school, two theatres, five banking offices, and three assay offices where crude silver bullion is moulded and assayed.

This place owes its rapid growth and prosperity to the rich veins of silver discovered here in the famous Comstock Ledge in June, 1859. These mines, including Gold Hill, which is a mile from Virginia, are the richest in the state. Silver amounting to 10,425,350 dollars was obtained in 1864. In that year there were six quartz mills in operation. Population in 1860, 2345; in 1868, about 20,000.

VIRGINIA, one of the thirteen original United States of North America, is situated between 36° 33′ and 40° 43′ N. lat., and 75° 25′ and 83° 40′ W. long. It is bounded N. by Pennsylvania and Maryland, S. by North Carolina and Tennessee, W. by West Virginia, and E. by Maryland and the Atlantic Ocean. The area of this state in 1860 was 61,352 square miles, or 39,265,280 acres, only 11,437,821 of which were cleared; but by the separation of West Virginia in 1862, the area was reduced to 38,300 square miles. The population, exclusive of West Virginia, described in the next article, is 1,261,397.

Coast.—The southern part of the peninsula which separates Chesapeake Bay from the Atlantic belongs to Virginia, and is surrounded by the sea, except on the north, where it borders on Maryland. This bay is 15 miles wide at its entrance, and extends inland in a N. direction about 180 miles. It is indented by many bays on both sides, and contains several islands. The larger bays are the estuaries of rivers, and constitute good harbours, admitting large vessels. The smaller bays are formed by indentations of the shores, and most of them have safe anchorage for coasting vessels. The headlands between the bays have low and frequently swampy shores, but at some distance from them the country rises from 15 to 20 feet. That part of Virginia which lies east of the Chesapeake Bay is skirted on the side of the Atlantic by many low sandy islands, which towards the north form one row, but towards Cape Charles two or three parallel rows.

Face of the Country and Mountains.—No state in North America presents a greater variety of surface than Virginia, from the mountains of the interior, and the rugged hills E. and W. of them, to the rich alluvions of the rivers, and the sandy flats on the sea-coast. It has probably a greater extent of mountainous country within its limits than any state E. of the Rocky mountains, though it does not attain so great an elevation as New Hampshire and North Carolina. White Top, in Grayson county, the highest land in Virginia, is about 6000 feet above the level of the sea. The state is usually divided into four sections:—1. The tide-water district, bordering on the Atlantic and Chesapeake Bay, is generally level, not more than 60 feet above tide, even in its highest parts. It is marshy in some districts and sandy in others, but clad with pitch-pine trees. 2. Farther west is a more elevated tract, called by some the Piedmont ('foot of the mountain') district. This section has fine woods, and is more varied, as well as more elevated in surface, than the previous one. 3. The valley district, which passes from Maryland into Virginia, near Harper's Ferry, about 50 miles N.W. of Washington. This district is crossed by the different ridges of the great Appalachian chain, known by various local names, and including extensive valleys of fertile land between them; and 4. The Trans-Alleghany dis-

trict, lying, as its name implies, W. of the mountains. This portion is most hilly and broken, or occupied with outlying spurs of the Alleghanies, and is now chiefly included in the new state of West Virginia.

The mountains extend across the middle of the state, in a S.W. and N.E. direction, and occupy a belt of from 80 to 100 miles in width. The Blue Ridge forms the eastern barrier of the mountainous region, and the Laurel, Greenbrier, and Great Flat Top mountains the western. Between these last and the Blue Ridge lie the Great North, Short, Mill, Jackson's, Peters', Potts', Walker's, Iron, North Branch, and Cheat mountains. Next to White Top, the highest summit is the Peak of Otter, about 4260 feet above the level of the sea. The Cumberland mountains are on the boundary between Kentucky and Virginia. The valley district, generally known as the valley of Virginia or the Shenandoah, is a table-land, elevated from 1200 to 1500 feet above the sea.

Geology.—A tract of the tertiary formation occupies the S.E. part of Virginia, from the sea and bay coast to a line slightly diverging S.W. from the N.W. angle of King George county, on the Potomac, passing near Richmond, and leaving the state near the S.W. angle of Brunswick county. This is succeeded by a wide belt of primary formation, reaching to the base of the Blue Ridge mountains. Two narrow belts of new red sandstone, having the same S.W. course, come to the surface in several parts of this great primary bed. West of the Blue Ridge, a narrow rim of Potsdam sandstone crops out, succeeded by a zone of Black River, Birdseye, and Trenton limestone, having near the middle of it the towns of Winchester, Staunton, and Lexington. This in turn is followed by various groups (extending in the same direction to the western mountain ridge), viz., of gray sandstone, Hamilton Group, including Tully limestone (this group contains shales of various colours, greywacke, pyrites, producing rock and limestone shales), Helderberg limestone, Portage and Chemung Groups (flag-stones, shales, and thin bedded sandstones), Medina sandstone (consisting of variegated sandstones and marl, and giving origin to brine springs), and the carboniferous limestone. The great Pennsylvania and Ohio bituminous coal-field occupies the space between the western slope of the mountains and the Ohio River, and the state of Kentucky.

Minerals.—Virginia is rich in minerals of the more useful sort, and in some of the precious metals. The list includes gold, copper, iron, lead, plumbago, coal, salt, gypsum (in vast beds), porcelain clay, fine granite, slate, marble, soapstone, lime, water-lime, and fire-clay. Vast fields of bituminous coal abound around Richmond, on the North Potomac and W. of the Alleghany mountains, and large beds of anthracite are found beyond the Great Valley. An inexhaustible supply of coal also exists on the Kanawha and its tributaries, and a vein of cannel coal, of considerable extent, near Charleston. Taylor computes the area of the coal regions of Virginia at 21,195 square miles, which is probably below the reality. A great variety of mineral springs, sulphur, warm, and chalybeate, are found in the Valley district, about the middle of the state. Copious salt springs abound in the S.W. Extensive salt mines occur in the same region, and are doubtless the source of the saline springs.

Rivers.—Virginia has numerous navigable rivers. They all originate within the mountain region or on the ranges which form the edges of that district. The greater number run E. and S.E., and flow into the ntic; the others N. or N.W. into the Ohio.

The Potomac, from its source to its mouth boundary between Maryland and Virginia. branches of this river drain the northern pa mountain region. Its north branch, which called simply the Potomac, rises in the Backl tains, and it runs with many bends N.E. a union with the south branch, which rises n N. lat., and runs nearly 100 miles before it from the north. The united river passes thro ridges of the mountain region with numerous shortly before it issues from the mountains by the Shenandoah. This large river rises lat., and drains nearly the whole of the moun north of that parallel and between the Kitta and the Blue Ridge. It flows 130 miles bel the Potomac. Immediately after the junct two rivers, the Potomac traverses the Blue narrow gap bounded by rocks, and enters th Slope, through which it flows S.E. till it mee at Georgetown, after which it becomes an estu gradually opens as it approaches Chesapeake where it mingles its waters with the Chesa 7½ miles wide. The Potomac may be navigat largest vessels as far as Alexandria, about 80 its mouth, and by vessels drawing not more th water to the Falls, which are 13 miles above A

The Rappahannock rises on the eastern sl the Blue Ridge, with two branches, which u a course of about 50 miles. The river then navigable, but 10 miles farther down it has and a short distance below them it meets the at Fredericksburg, up to which it may be nav vessels of considerable burthen. Its course 160 miles.

York River originates in the South-east m with two branches, which unite after a course 100 miles, and form the York River, which is from 1 to 3 miles across. After a course of falls into Chesapeake Bay. This river is very for navigation. It admits the largest ships town, 12 miles from the sea, where it forms a harbour. Up to the union of its two branche depth of 3 fathoms, and admits coasting vess

The James River rises in that part of the region which lies between the Alleghany moun the Kittatinny chain, with two branches, wh mence near 38° 30′ N. lat., run for nearly 4 and then unite. The James River thus fo with great rapidity S. between high moun turns to the E. above Pattonsburg, where feet above the sea-level. It passes through Ridge at the Balcony Falls, which impede t tion, but are avoided by a canal about 6 m At this place the level of the river is 500 the sea. Below Lynchburg it turns to the runs with great rapidity, but is navigable down the current of the river becomes more it approaches the falls above Richmond, where 80 feet within 6 miles, and immediately belo it meets the tide. A canal connects the below and the navigable water above the fall the latter the river gradually widens and b estuary, and after a course of 90 miles farther in Chesapeake Bay. The wide expanse of affords a harbour for vessels of any size, call ton Roads, but it is not safe in winter. La may sail up to Jamestown, more than 20 m the Roads; but beyond that there are but water, and only vessels of about 100 tons u

as Richmond. The direct length of this river is 320 miles; but with the bends it is probably miles. The largest of the affluents of the James is the Appomattox, which rises at the base of outh-east mountains, and runs about 150 miles. navigable to Petersburg for vessels of 100 tons. ivanna and the Willis rivers are two other affluents James.

e upper course of the Roanoke lies within Virginia. river rises in the mountain region, about 2000 bove the sea-level; but at Salem, 15 miles from rce, it is only 1006 feet above it. After having through the Blue Ridge and the South-east tains, it runs E.S.E. with numerous bends until it North Carolina.

e Ohio, Monongahela, Little Kanawha, Great wha, Greenbrier, and Gauley rivers, which formerly ged to this state, are now included in West Virginia.

mate.—There is necessarily, from its topography, variety in the climate of Virginia. In the low ry, near the coast, it is hot and unhealthy in er, and bilious and intermittent fevers prevail in n. It is mild, however, in winter. The central untain counties enjoy a cool and salubrious tem- re, with warm days, it is true, but the nights are nd refreshing. West of the mountains, though degrees cooler than on the coast in winter, the ers in parts are very hot. Spring is the pleasant- riod of the year in most parts of the state.

l and Productions.—George Washington pro- ed the central counties of Virginia to be, in his he finest agricultural district in the United States, aniel Webster declared, in a speech in the Shenan- Valley, that he had seen no finer farming land in uropean travel, than in that valley. There is no that, with a better system of culture, Virginia has element of industrial greatness; a climate equally ed from the extremes of the north and the south; with every variety, from the light sands of the east (favourable to the peach, sweet potato, melon, her fruits), to the rich alluvions of the river bot- nd mountain valleys, favourable to wheat, Indian tobacco, and even, in some parts, to cotton and mountain pastures, capable of supporting large of sheep, and herds of cattle and swine; the finest r on the Atlantic coast; navigable rivers, abound- shell and fin fish, furrowing her plains and valleys e east and on the west, and affording, besides, nse water power; and with the most useful mine- abundance, she requires only the energy that has displayed in some of the northern states to make e leading state of the Union, and one of the most ble to reside in. In the culture of tobacco, Vir- has always surpassed every other state, and was he first place in which its culture was practised by ed men to any considerable extent. It was even for a time as the currency of the country. The great staples are Indian corn, wheat, oats, live , and butter. Rye, wool, peas, beans, Irish and potatoes, buckwheat, fruits, market products, e, hay, grass-seeds, flax, maple sugar, beeswax, , rice, cotton, barley, wine, hops, hemp, silk, nolasses, are also produced in larger or smaller ities. Wild animals are now rare on the east f the mountains, but they are still found in the rn districts. The most common are bears, wolves, the raccoon, squirrel, and opossum. Immense num- f oysters are caught on the coasts, it being com- that, in addition to the home consumption, which is very large, not less than 15,000,000 bushels per annum are exported.

Manufactures, &c.—As is generally the case in the southern states, Virginia is less engaged in manufactures than in agriculture, though the former branch of industry is yearly claiming more attention and enlisting more capital; and now that slavery is abolished no doubt her vast natural resources of coal, iron, copper, and abundant water power, will be much more availed of than ever. Before the commencement of the civil war the state contained about 1800 miles of railway, but very much of it was destroyed during the struggle. Compared with her advantages in respect to harbours and rivers, as well as to the variety of her products, the direct foreign trade of Virginia has hitherto been small, her commerce having been mainly carried on through the ports and shipping of the north. There is, however, a good coasting trade. The exports are chiefly tobacco, Indian corn, wheat, flour, coal, wood, and oysters.

Education, &c.—Virginia has no general free school system, but makes an appropriation for the instruction of the poor. Education is by no means so widely diffused as in some of the northern states. There is, however, a state university, about twenty colleges, 350 academies, and 4000 public schools. General Robert E. Lee, the commander-in-chief of the Confederate army during the civil war, was, shortly after its termination, elected president of Washington College, Lexington, an institution of high standing, founded in 1781.

Of the 3105 churches in Virginia in 1860, the Baptists owned 787, the Christians seventy-three, the Episcopalians 188, the Friends seventeen, the German Reformed twelve, the Jews three, the Lutherans sixty-nine, the Methodists 1403, the Presbyterians 290, the Reformed Presbyterians ten, the Roman Catholics thirty-three, the Unionists 175, the various minor sects forty-five—giving one church to every 533 persons.

In 1860 Virginia had fifteen daily, five tri-weekly, eleven bi-weekly, and 103 weekly newspapers; and five monthly magazines or reviews. The whole number of copies issued annually was 27,000,000.

At Staunton are the Institution for the Deaf, Dumb, and Blind, and the Western Insane Asylum, both state institutions. The Eastern Insane Asylum is at Williamsburg, and the State Penitentiary at Richmond.

The white population of Virginia is mainly of British origin, and until a recent period was very slightly affected by admixture from other sources. The Virginians have always prided themselves on their purity of descent, many of them having sprung from the old Cavalier stock; and 'one of the first families of Virginia' has become a proverb in the United States.

Towns, &c.—Virginia is divided into 124 counties. RICHMOND is the seat of government. The following are the chief places of interest, with the population of each in 1860:—*Alexandria*, a port of entry on the right bank of the Potomac, 7 miles below Washington. Although 80 miles from its mouth, the river is here a mile wide, and forms a commodious harbour, deep enough for the largest ships. The city is pleasantly situated on undulating ground, with a fine view of the Capitol at Washington and of the Potomac. The streets cross each other at right angles and are generally well paved. The public buildings are a court-house, and about twelve churches. There are also some good schools. Flour and grain are exported, and the town also has some cotton manufactures. A canal to Georgetown, 90 miles distant, intersects the Chesapeake and Ohio Canal, and there is good railway accommodation, so that the port

is steadily increasing. Population, 12,654. *Charlottesville*, a small town, 85 miles W.N.W. from Richmond, on the Rivanna, contains about 3000 inhabitants. It is beautifully situated in the midst of a fertile valley, and is connected by railway with Richmond and other towns. There are a court-house, and several places of worship; and a preparatory school for boys destined for the University of Virginia, which is about a mile and a half distant from this town. The buildings of the university occupy three sides of an oblong quadrangle about 500 feet long by 150 wide. The principal, called the Rotunda, at one end of the quadrangle, is of brick, circular, with a flattened dome, and a Corinthian portico. It is a copy of the Pantheon at Rome, and about one-half of the diameter of the original building. The university was opened in 1825, and is supported by the state. An observatory is attached to it. The university is governed by a rector and nine visitors. There are schools of ancient languages and history; modern languages, history and literature; mathematics; natural philosophy, mineralogy and geology; chemistry, pharmacy, and materia medica; law; medicine, &c. The state pupils are free. There are about 600 students, and the library contains 30,000 volumes. *Fredericksburg.* [FREDERICKSBURG.] *Harper's Ferry*, a village situated at the confluence of the Shenandoah with the Potomac River, where the united stream breaks through the Blue Ridge, is 160 miles N. of Richmond, and 53 miles N.W. of Washington. The scenery in the vicinity is in the highest degree beautiful and picturesque. Thomas Jefferson considered the 'passage of the Potomac through the Blue Ridge one of the most stupendous scenes in nature, and well worth a voyage across the Atlantic to witness.' The place was originally called Shenandoah Falls. Its present name was derived from a ferry established across the Potomac, which has since given place to a fine bridge, about 800 feet in length. There is another bridge for the Baltimore and Ohio Railway, which here crosses the river. The Ohio and Chesapeake Canal also passes by the village, which is compactly, though irregularly, built around the base of a hill, and is the centre of considerable trade. It has four or five churches, and several manufactories and mills. It formerly contained a United States armoury, in which about 250 hands were employed, producing, among other articles, about 10,000 muskets annually, and a national arsenal. The arsenal was burned by the military in the spring of 1861, just before the place was captured by the Confederates. Harper's Ferry was the scene of the abolition raid, in 1858, which rendered John Brown famous. Population, 1339. *Jamestown*, where the first colony was settled, is now deserted, and nothing remains but a few ruins. The site is 65 miles S.E. by E. from Richmond. It was the seat of the colonial government from 1607 till 1698, when Williamsburg was made the capital, and continued to be so till 1779, when Richmond became the seat of the first American state government. *Lexington*, 146 miles W. by N. from Richmond, is near the W. bank of North River, a tributary of the James River. It is situated in a valley and surrounded by beautiful mountain scenery. It contains a court-house, gaol, four churches, Washington College, and the Virginia Military Institute. The college was founded in 1798, and endowed by Washington with a library of 5000 volumes. Population, 2000. *Lynchburg*, 116 miles W.S.W. from Richmond, is situated on the S. bank of James River, 20 miles below the Great Falls where the river passes through the Blue Ridge. The scenery around the town is exceedingly picturesque. The South Side Railroad, leading Petersburg and Richmond, here unites with the Virg and Tennessee line, which forms part of the most di route from the eastern states to those of the south-w and is one of the principal thoroughfares of the south states. The James River and Kanawha Canal, greatest public work in the state, following the co of the river from the falls at Richmond, also pa Lynchburg, and renders the town the market of extensive and fertile tract of country. The princ articles of trade are tobacco, wheat, flour, and he The town is supplied with river-water from a reser which is elevated about 253 feet above the level of river, and contains 400,000 gallons. The river is h about 200 yards wide, and is crossed by a fine brid It affords abundant water power, which is employed the manufacture of tobacco, cotton, wool, flour, The town has a court-house, nine churches, a colle and a female academy. Population, 9853. *Norfo* 106 miles S.E. from Richmond, is situated on the N bank of Elizabeth River, 8 miles from its entrance i Hampton Roads. The river, which is nearly a m wide, separates Norfolk from Portsmouth, on the op site side. The harbour is excellent, sheltered from winds, and has depth of water for the largest vess Its foreign commerce is the most extensive of any pl in the state, and, next to Richmond and Petersburg, the most populous town at the last census. The site of city is almost a dead level; the plan is somewhat ir gular; the streets are wide, and the houses generally w built of brick or stone. The most conspicuous pub buildings are the city-hall, the Norfolk military acade the mechanics' hall, custom-house, Ashland hall, an Baptist church, with a steeple 200 feet high. There altogether fourteen churches, nine seminaries, an h pital, an orphan asylum, and three banks. Five new papers are published in the town. The trade of Norf is facilitated by the Dismal Swamp Canal, which open communication between Chesapeake Bay and Albema Sound, and by the Seaboard and Roanoke Railro which connects it with the towns of North and So Carolina. The canal, constructed with great labo through the Dismal Swamp, is navigable by schoone and brings a very extensive trade in corn and lumb There is also a line of railway to Petersburg and t interior of Virginia. Within a few years many substant warehouses and handsome dwellings have been erect giving evidence of increased prosperity, consequent these internal improvements. Norfolk communicates wi New York and Philadelphia by regular lines of oce steamers. The entrance of the harbour is defended by Fo Calhoun and Munroe, the latter the largest in Americ Norfolk was founded in 1705, and burnt by order Lord Dunmore, the British governor, in 1776. Pop lation, 15,620. *Petersburg*, 23 miles S. by E. fr Richmond, is situated on the south bank of the App mattox, about 12 miles from its junction with Jam River at City Point. It is the second town in Virgin in respect of population, and possesses extensive faciliti for business. Vessels of 100 tons ascend the river the town, and those of larger size to Waltham's Lan ing, 6 miles below. The South Side Railroad h its E. terminus at this place, and the Appomatto line connects it with City Point, at the mouth the river, where the very largest vessels discha their cargoes. The town has also three other lin which connect it with different parts of the state, a contribute much to its prosperity. Large quantiti of flour and tobacco are exported. Petersburg is w

built, and contains several churches, three banks, cotton and tobacco factories, a woollen factory, rope-walks, iron foundry, and numerous mills of various kinds, as the falls of the river, which arrest the ascent of the tide immediately above Petersburg, furnish extensive water power. Around these falls a canal has been constructed, by which means small boats ascend the river for the distance of about 100 miles above Petersburg. The limits of the town include the decayed village of Blandford, in Prince George county, which was once superior to Petersburg in some respects. The remains of the church are among the most interesting and picturesque ruins of Virginia. During the American civil war, Petersburg withstood a very protracted siege on the part of the Federals, who were defeated with great loss in more than one attempt to capture it; but it was ultimately taken on April 2, 1865, and as its surrender was immediately followed by that of Richmond, the event may be said to have ended the war. Population, 18,266. *Portsmouth*, a seaport and important naval depot on the left bank of Elizabeth River, opposite Norfolk, is 8 miles from Hampton Roads, and 160 miles by water S.E. of Richmond. The river, which is about half a mile wide, forms a safe and excellent harbour, accessible to vessels of the largest size, in which several ships of war are usually lying at anchor. The general government has at Gosport, a suburb of Portsmouth, a large and costly dry dock, which is capable of admitting the largest ships. More than 1000 hands are sometimes employed in the construction of vessels at the navy-yard. At the secession of Virginia, in 1861, it was attacked by some Confederate troops, and was hastily set on fire and deserted by the Federals. Several of the largest vessels in the America navy were either sunk or burnt. Besides the United States naval hospital in the vicinity, a large and showy building of stuccoed brick, Portsmouth contains a court-house, six churches, a bank, the Virginia literary, scientific, and military academy, and some tobacco factories. The town is situated on level ground immediately below the junction of the south and east branches of the river, and the streets are straight and rectangular. It is the terminus of the Seaboard and Roanoke Railroad, which, with connecting lines, opens a communication with Charleston, South Carolina. Since the construction of this railroad the town has increased considerably in population and business. Ferry-boats ply constantly from Portsmouth to Norfolk, and daily steamboats communicate with Richmond. Population, 9496. *Staunton*, 100 miles W.N.W. from Richmond, is situated on Lewis Creek, one of the head branches of the Shenandoah, and on the Virginia Central Railway. It is the seat of the Western Lunatic Asylum and of the Virginian Institution for the Deaf, Dumb, and Blind. There are twelve churches, two banks, several schools, and some mills, foundries, and manufactories. The surrounding country is highly productive and beautifully diversified, forming part of the great Valley of Virginia. The population of the town is 3875. *Wheeling*, formerly in this state, is now the capital of West Virginia. [VIRGINIA, WEST.] *Williamsburg*, 58 miles E.S.E. from Richmond, lies inland between the James and York rivers. It was formerly the legislative capital of Virginia, but is now a declining town, with about 1500 inhabitants. The only building of importance is the College of William and Mary, founded in 1692, being the oldest literary institution in the United States except Harvard University, and at present attended by about 100 students. The library has 53,000 volumes. Presidents Jefferson, Madison, and Monroe, Chief-justice Marshall, and General Scott, were educated in it. Williamsburg is also the seat of the Eastern Lunatic Asylum, which has a high reputation for its neatness, order, and accommodation. *Winchester*, 146 miles N.N.W. from Richmond, is situated on an affluent of the Potomac, in a beautiful and fertile country, which forms part of the Valley of Virginia. It is regularly laid out, and the houses are chiefly built of brick and stone, in a compact and substantial manner. There are twelve churches, two banks, and an academy. It is connected by railway with Baltimore, Harper's Ferry, and other parts of the state, and has a good general trade. During the civil war it was the scene of several conflicts. Population, 4392.

Constitution.—The first state constitution of Virginia was adopted June 29, 1776. The legislature consists of fifty senators, who are elected for four, and 152 representatives, who are elected for two years. A re-apportionment must take place every ten years from 1865, so that the numbers may always be arranged as near as possible on the basis of population and taxation. The governor is elected for four years. Virginia sends two senators and thirteen representatives to Congress.

History.—Virginia, the first Brittish settlement in North America, was discovered by John Cabot in 1497. It was taken possession of by Sir Walter Raleigh, and named in honour of the virgin-queen, Elizabeth, on the 13th of July, 1584. Fruitless attempts were made to colonize it in 1585. It was granted by charter to the London Company, and a settlement made at Jamestown, on the James River, May 13, 1607. The planters were chiefly men of birth and fortune, with only a few labourers and mechanics, and though received by the Indians in an amicable spirit, were mostly swept away in a few months by the diseases of a damp climate, aggravated by insufficient food and hard labour. Only the energy and determination of Captain John Smith—whose name is indissolubly connected with the beautiful story of Pocahontas, the Indian chieftain's daughter—saved the young colony from destruction; and even his exertions must have failed, but for the opportune arrival of Lord Delaware in 1610, with a reinforcement of emigrants and a supply of stores and provisions. The marriage of Pocahontas, in 1613, to John Rolfe, secured the colony a close alliance with a powerful chief, and in the years of tranquillity that followed it made good its hold upon American soil. It was not until it became a crown colony in 1626, however, that its prosperity really commenced. It then increased so rapidly that in 1649 it numbered 15,000 English, mostly of good descent, and counted several thriving towns, and twenty churches. In 1742 its capital, Richmond, was founded. Soon afterwards Portsmouth grew into some importance as a safe and commodious harbour. In 1769 Thomas Jefferson, one of its representatives, claimed for the colony the privilege of self-taxation, and Virginia was foremost in the great struggle which secured the independence of the United States. It returned George Washington as its delegate to the Congress of 1774, and was the largest and most populous of the original thirteen states, or the 'Old Dominion,' contributing without stint its best blood, intellect, and treasure, to the sacred cause. It has been called the 'Mother of Presidents,' four out of the five elected before 1825 having been Virginians: namely, Washington, Jefferson, Madison, and Monroe. To the American Congress it has also returned some of the members most distinguished for statesmanlike views and animated eloquence, and it has never failed to boast of its pure blood, many of its

families tracing their descent from the proudest of the English cavaliers, and the most ancient of the English aristocracy. But it has always been conspicuous for its hatred of the North, and its devotion to the principle of states' rights. When the civil war broke out in 1861, Eastern Virginia immediately seceded from the Union (April 25), and Richmond became the capital of the Confederacy. Recognized as at once the heart and brain of the new power, the Northerners devoted their grandest efforts to its subjugation, and the valley of the Potomac was the scene of many desperate engagements, while the lines of the Shenandoah, the Rappahannock, the Chickahominy, and the Rapidan were contested with equal determination. Richmond fell, after a siege of 1452 days, on the 2nd of April, 1865, and with its surrender the entire fabric of the Confederacy collapsed.

Western Virginia refused to follow her sister in her career of secession, declared herself an independent state, nominated a governor, and was formally admitted into the Union by Act of Congress, December, 1862. [VIRGINIA, WEST.]

VIRGINIA, WEST, one of the United States of North America, is bounded on the N. by Pennsylvania and Maryland, on the S.E. by Virginia, on the S.W. by Virginia and Kentucky, and on the N.W. by Ohio. Excepting a small portion forming the northern extremity, and called the Panhandle, it lies between 37° 6′ and 39° 44′ N. lat., and between 77° 40′ and 82° 35′ W. long. Its outline is very irregular. The greatest length from N. to S. is about 250 miles. The area is estimated at 23,000 square miles.

The surface is generally hilly and mountainous. The north-eastern part is traversed by the main ridge of the Alleghanies, which also forms part of the boundary between the state and Virginia. The direction of the ridge is N.E. and S.W. Nearly parallel with it are several ranges of mountains called the Greenbrier, the Cheat mountains, &c. The average altitude of the summits of the Alleghanies in this state is about 2500 feet above the level of the sea. The elevation of the Greenbrier Valley, which is more than 100 miles long, is stated to be 1500 feet. Of the scenery of West Virginia, the historian, Bancroft, observes:—'It has a character of grandeur of its own; and in the wonderful varieties of forest and lawn, of river and mountain, of nature in her savage wildness, and nature in her loveliest forms, presents a series of pictures which no well-educated American should leave unvisited. We cross the Atlantic in quest of attractive scenes; and lo! we have at home, alongside of the great central iron pathway, views that excel anything that can be seen among the mountains of Scotland, or in the passes of the Apennines.' The motto of the state is, *Montani semper liberi*, 'Mountaineers always free.'

Iron, coal, salt, petroleum, and limestone are abundant in West Virginia, which is also said to contain copper, lead, nickel, and antimony. Immense beds of bituminous coal are found in the Panhandle, in the Kanawha Valley, on the banks of the Monongahela, below Clarksburg and near Cheat River. The iron of West Virginia is almost co-extensive with its coal. Rich mines of it have been opened in Preston county, in the Kanawha Valley, and in other parts of the state. Large quantities of salt are procured near Charleston on the Kanawha, and in Mason county. Limestone is found in many parts of the state, and is often associated with iron and coal. Petroleum abounds in several parts, and on M'Farland's , a tributary of the South Fork of Hughes' River, is a large deposit of asphaltum, or solidified rock oil, known as the Great Vertical Asphaltum Lode.

Rivers.—The Ohio forms the entire western boundary of this state. It is navigable the whole distance for vessels of 30 or 40 tons burthen, though there is a ra above the mouth of the Great Kanawha, called Lo Rapids, over which the Ohio runs for half a mile great velocity. The state is also intersected by Great Kanawha, and drained by the sources of Greenbrier, the Monongahela, the Cheat River, the andotte, the Elk, the Gauley, and the Little Kan The Big Sandy River forms the boundary between Virginia and Kentucky. The Great Kanawha, crossing the southern boundary, flows in a north- direction, and enters the Ohio at Point Pleasant. navigable for steamboats for nearly 100 miles from mouth. In the upper part of its course it is called New River. Its principal tributaries are the Green the Gauley, and the Elk. The Greenbrier rises in eastern part, flows south-westward, and enters Kanawha or New River at the S.W. extremity Greenbrier county.

The climate is mild and salubrious. The mean annu temperature is said to be lower than that of any sta region in the same latitude east of the Missouri Riv The isothermal line, indicating the mean temperatur 52°, passes near the centre of the state. The amount rain which falls in a year is between 32 and 36 inch

The soil is generally productive, not only in t valleys, but even on the sides and tops of the hi which are specially adapted to pasture and sheep-b ing. The state is abundantly supplied with timb including the oak, walnut, hickory, ash, wild cher tulip tree, sugar maple, &c. The staple productio are Indian corn, wheat, oats, potatoes, and hem Large quantities of wool, petroleum, tobacco, buckwh maple sugar, &c., are also produced. According to t census of 1860, the territory now included in We Virginia contained 2,346,137 acres of improved a 8,550,257 acres of unimproved land. It produced that year 2,302,567 bushels of wheat, 7,858,647 Indian corn, 1,649,090 of oats, 746,606 of ba potatoes, 2,180,316 pounds of tobacco, 1,073,162 wool, and 4,760,779 of butter.

The northern part of the state is traversed by t Baltimore and Ohio Railroad, which connects Wheelin with Baltimore, &c. The North-western Virgin Railroad extends from Parkersburg, on the Ohio Riv to the Baltimore and Ohio line at Grafton.

By the constitution of the state the legislature required to establish an efficient system of free schools and a considerable portion of the public income is s apart for a school fund. A state superintendent placed at the head of the system.

According to the census of 1860, the districts included in West Virginia had a population of 376,68 of whom 358,317 were free, and 18,371 were slaves.

Wheeling is the capital of West Virginia. It is city and port of entry, finely situated on the E. bank the Ohio, and on both sides of Wheeling Creek, 92 m below Pittsburg, and 351 miles N.W. of Richmond. T city stands on a narrow tract of land, extending ab 2 miles along the river, and overlooked by precipi heights, so that any future extension of it must made on the banks, as no more building can b place at the back. The streets cross each other right angles, and are well paved. Wheeling is most important place on the Ohio River between P burg and Cincinnati, and is fast increasing in rep

trade, manufactures, and population. It contains a fine court-house, a custom-house, nineteen churches, three academies, and four banks. Four or five newspapers are published. The town is supplied with water raised from the river by machinery. The National Road crosses the river at Zane's Island, opposite the city, by a beautiful wire suspension bridge, the span of which measures 1010 feet. It is supported by four wire cables, each 1380 feet in length, and 8 inches in diameter. Wheeling is the western terminus of the Baltimore and Ohio Railroad, 380 miles long, and of the Hempfield line, which joins that of Pennsylvania at Greensburg; 4 miles S. is the E. terminus of the Central Ohio Railroad. The Cleveland and Pittsburg line also passes through the town. The hills which rise in the immediate vicinity contain inexhaustible beds of coal, which supply fuel at a small expense to the numerous manufactories. There are six iron foundries, three forges, five manufactories of nails, nine of glass, three of cotton goods, three of paper, four of steam-engines, and one of silk goods. Flour, woollen fabrics, white-lead, leather, and other articles are also produced, and shipbuilding is carried on somewhat extensively. The free population in 1860, including South Wheeling, was 16,713. Population in 1868 about 23,000. The only other towns in West Virginia of any importance are Martinsburg and Parkersburg.

Martinsburg is on Tuscarora Creek, and the Baltimore and Ohio Railroad, 100 miles W. of Baltimore. It is situated in a fertile and elevated region, a few miles W. of the Blue Ridge; has an active trade, and is an important station on the railroad, containing the machine shops and engine houses of the company. The abundant water power furnished by the creek is employed in the manufacturing of flour, iron, &c. The town contains a court-house, a jail, six churches, two academies, and an almshouse. Population, 3364.

Parkersburg, on the Ohio River, at the mouth of the Little Kanawha, 100 miles below Wheeling, and about 380 by railroad W. of Baltimore. It is pleasantly situated and neatly built. Another railroad extends westward to Cincinnati. The town contains a court-house, six churches, banks, a printing-office, and several steam mills. Wells of rock-oil abound in the vicinity. The population in 1867 was about 7000.

The governor of West Virginia is elected by the people for two years, and receives 2000 dollars per annum. The legislative power is vested in a senate and a house of delegates — the former consisting of twenty-two, elected for two years; and the latter of fifty-seven delegates, elected for one year.

This state formed part of Virginia until the latter seceded from the Union, April, 1861. On the 11th of June, 1861, representatives from forty counties assembled at Wheeling, protested against the act of secession, and took measures to form a provisional government. A convention met at Wheeling on the 26th of November, 1861, and framed a constitution for a new state, which was adopted by the vote of the people on the 3rd of May, 1862. An Act of Congress for the admission of the state of West Virginia into the Union was approved by the president on the 31st of December, 1862, but it is of disputed constitutionality. A large majority of the West Virginians actively supported the cause of the Federals in the late war. Slavery was abolished by the legislature on the 3rd of February, 1865. A political antagonism or jealousy had long existed between the people of West Virginia and those residing in the eastern part of the state of Virginia, from whom they were separated by the Alleghany mountains. The latter, having control of the legislation, employed it in favour of their own section, by compelling the west to pay *pro rata* for internal improvements in Eastern Virginia, and taxing only nominally the property in slaves, which were much more numerous in the east than the west.

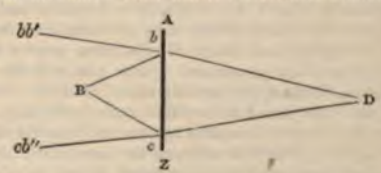
VIRGO (Constellation), the sixth constellation in the zodiac, surrounded by Libra, Boötes, Leo, and Corvus. It is best known by two remarkable stars; the first, Spica (α Virginis), a star of the first magnitude, is in the hand, which holds ears of corn, typical of the harvest, which approached in the time of the Greeks as the sun neared this star; the other, Prævindemiatrix, or Vindemiatrix (ε Virginis), took its name from the vintage. The star Spica forms a remarkable triangle with Arcturus and β Leonis (or Denebola); and of the bright stars in this triangle, Vindemiatrix is the one nearest to the line joining Arcturus and β Leonis.

Hesiod and Arátus unite in representing Virgo to be Justice, who retired to heaven when the golden age came to an end: the former makes her the daughter of Jupiter and Themis; the latter, of Astræus and Aurora: others represent her as Fortune, others Ceres, &c.

VIRIA'THUS, or VIRIA'TUS, the leader of the Lusitanians, in Hispania, in their war with the Romans, about the middle of the second century B.C. When the Roman prætor Servius Galba treacherously massacred a large body of the Lusitanians (B.C. 150), Viriathus was one of the few who escaped. In 149 B.C., a Lusitanian army having been defeated by Caius Vetilius, the fugitives, who were blockaded, were on the point of surrendering, when Viriathus by a skilful manœuvre released them, and was appointed their general. In a battle which took place shortly afterwards, he defeated and killed Vetilius. In the three following years he defeated successively three prætors. In B.C. 145 the Romans sent against him the consul Q. Fabius Maximus Æmilianus, who checked his successful course. At last, in B.C. 140, the consul Q. Servilius Cæpio secured his person through the treachery of some of his friends, and put him to death.

VI'ROLA SEBI'FERA, a large tree of Guiana, which belongs properly to the genus *Myristica*, and is in fact by some called the Nutmeg of Cayenne, has the same properties as many of the other species of that genus. When incisions are made into the bark, a reddish glutinous juice exudes, which, when fresh, is used as a caustic, and which concentrates in time. Within the mace is a kernel of a whitish colour, and this, when powdered and put into boiling water, yields a yellowish-coloured fatty substance which swims on the surface. In the country candles are made of it. This vegetable fat or tallow is sometimes met with in commerce in square loaves.

VIRTUAL FOCUS, in Optics, the point from which rays that have been diverted by reflection or refraction appear to issue. Thus A Z is a section of a metallic



speculum; B, a radiating point; B *b* and B *c* are rays falling on the speculum at *b* and *c*, and reflected into the directions *b'* and *c b''*. Then the point, D, at the conjunction of the straight lines, *b b'* and *c b''*, becomes the virtual focus of the reflected rays.

VIRTUAL VELOCITIES, *The Principle of*, is the name given to a most important generalization in mechanics, which forms the basis of all the general methods employed in the solution of problems relating to equilibrium.

By *virtual velocity* is meant the line described by the point of application of a force if the equilibrium of the system to which it is applied receive an infinitely small disturbance. The product of the force (P) into the projection (p) of the virtual velocity upon the line of direction of the force, is called the *moment* of this virtual velocity. Then P, P′, P″, &c., being different forces applied to a system in equilibrium; p, p', p'', &c., the respective projections of their virtual velocities consequent upon an infinitely small disturbance of the equilibrium, the principle of virtual velocities is expressed in the following equation:

$$Pp + P'p' + P''p'' + \&c. = 0;$$

or the sum of the moments of the virtual velocities in such a system, and under such circumstances, is always equal to zero. This principle, discovered by Galileo, and developed by John Bernoulli, is made by Lagrange the basis of his 'Mécanique Analytique.' A demonstration of it is given in most modern works on mechanics. It is necessary to observe that the terms *virtual*, *velocity*, and *moment*, used in speaking of this principle, are not applied in their ordinary meanings.

VIS VIVA, a name given in Mechanics to the sum of all the masses of a system, each multiplied by the square of its velocity.

VISCO'NTI, the name of a family in Lombardy, several members of which rose to the rank of sovereign princes during the middle ages. About the middle of the thirteenth century they belonged to the feudal nobility, and possessed estates near the banks of the Lake of Como and of the Lago Maggiore. In 1262 the archdeacon Ottone Visconti was nominated archbishop of Milan by Pope Urban IV., but owing to the ascendancy gained by the partisans of Martino della Torre, the popular leader, one of whose kinsmen had been appointed to the see by the electors, Ottone was obliged to leave the city; and it was not until 1277 that he overcame his enemies, and was enabled to enter Milan in triumph. He gave up the temporal government to his nephew Matteo Visconti in 1288. The Torriani, however, continued the struggle, and in 1302 Matteo was forced to leave Milan, where Guido della Torre was chosen in his place as 'perpetual captain of the people,' continuing in this office till 1311, when his family were exiled. Matteo Visconti then resumed his authority over Milan. Some time after, Matteo obtained possession of Pavia; and Alessandria, Tortona, Cremona, Bergamo, Lodi, and other towns, acknowledged in succession the rule of the Milanese lord. Matteo was opposed by the pope; a number of charges were brought against him; he was condemned, March 14, 1322, as a heretic; and his children and grandchildren were excluded from every honour, dignity, and office. He died three months after the sentence was pronounced against him, and his son, Galeazzo Visconti, was proclaimed lord of Milan. Upon this the pope issued an interdict against the city, and proclaimed a general crusade against the Visconti family. The aid of Louis of Bavaria and the exertions of Marco Visconti, brother of Galeazzo, saved Milan: but Louis and Galeazzo quarrelled in 1327; the latter was thrown into prison, released after eight months' confinement, and died in exile. His son, Azzo, bought the appointment of imperial vicar of Milan from Louis, and he was the first lord of Milan who struck coin in his own name, omitting that of the reigning emperor. He di 1339, and his uncles, Luchino and Giovanni, succ him. Giovanni was archbishop of Milan and a card and resigned the government to Luchino, who br under his dominion the towns of Asti, Bobbio, Pa Crema, Tortona, Alessandria, and Novara. Luc died, January, 1349, leaving the archbishop Gio Visconti lord of Milan, who died in 1354.

His three nephews, Matteo, Galeazzo, and Bar conjointly succeeded him in the lordship of the to Milan and its territory, but they divided among the other towns which had become subject to the Visc Matteo had for his share the towns south of the namely Bologna, Parma, Piacenza, and Bobbio, be Lodi; Barnabò had the towns east of the Adda—Bre Bergamo, Crema, and Cremona; and Galeazzo too himself Pavia, Asti, Alessandria, Tortona, Ver Novara, Vigevano, and Como. In September, 1 Matteo died suddenly, and his brothers divided his s of the territories. The city of Bologna, however, was to the Visconti through the treachery of the gov Oleggio, who sold it to the pope's legate, occasioni desultory war to be carried on in Lombardy and Rom for some years, with great cruelty and ferocity. Gale encouraged learning: he opened the University of P about the year 1362, and collected a considerable lib His son Gian Galeazzo married Isabella, daughter of J John of France, and his daughter Violante became wife of Lionel, son of Edward III. of England. Gale died at Pavia in 1378, and was succeeded by his Gian Galeazzo.

Barnabò continued to rule Milan and the rest of territories till May, 1385, when Gian Galeazzo surpr him, and shut him up in the castle of Trezzo, w he died seven months after. In May, 1395, Gian G azzo obtained of the Emperor Wenceslas a diplo creating him Duke of Milan; and by a subsequent perial diploma, the boundaries of the duchy of M were defined, and made to include twenty-five tow from Verona, Vicenza, and Belluno on the east, Alessandria and Tortona on the west. In 1402 G Galeazzo was only waiting for the surrender of Flore to declare himself king of Italy, when he died of plague.

Giovanni Maria Visconti, his eldest son, aged fourte was then proclaimed duke. He proved pusillanimo suspicious, and cruel, and was murdered, May 16, 14

Filippo Maria Visconti, the second son of Gian Ga azzo, was the next duke. He reigned thirty-five ye dying at Milan in 1447. His son-in-law, France Sforza, succeeded him as duke of Milan. [Sforza, Francesco.] The dynasty of the Visconti, wh may be considered as having commenced with Matt in 1288, ended with Filippo Maria, and it constitut one of the most powerful Italian principalities of t middle ages.

VISCOUNT (*vice-comes*, Norman French, vicom a degree or title of nobility next in rank to an earl a immediately above that of baron. It is the most recent established English title, having been conferred letters patent on John, Lord Beaumont, by Henry V in 1440. [Titles of Honour.]

VISCUM. [Mistletoe.]

VISEU. [Beyra.]

VISHNU (from *vis*', 'to enter' or 'to pervade occupies the second place in the Trimvurter, or Tri of the Hindus, and is the personification of the preserv principle. There is no doubt that his worship is of very ancient date, as there are distinct allusions to h

in the Vedas; but at the same time it is evident that it has experienced successive and considerable changes, and that the forms under which Vishnu is now worshipped in India are far from being authorized by the above books.

In these he generally appears only as the younger brother of Indra, the personified firmament, and inferior to him. But it is difficult to determine from the numerous passages in which he is mentioned, which place was assigned to him in the original mythology. There is no trace of Vishnu, or anything relating to him, in the Institutes of Manu. Yet the two heroic poems, the 'Mahâbhârata' and the 'Râmâyana,' which are generally supposed to belong to the same period of Hindu literature as the Institutes, have for their subjects two of the latest incarnations of this god. He is said to have appeared before the other celestials, and to have agreed at their humble request to become man for the purpose of destroying the dæmon Râvana, and to remain incarnate among men for 11,000 years, in order to protect the world after saving it. The order of the Avatâras, descents or incarnations of Vishnu, is not determined. There have been nine, and the tenth is yet to come.

Vishnu's Avatâra as Krishna is probably as ancient as the others, and it has facilitated, as it were, the transition from the elder belief of the Hindus to that which we find them professing in our days, and serves for the foundation of the worship of deified heroes. Krishna was a portion of Vishnu, who had consented to be born of Devakî, the wife of Vasudeva. When the portion of Vishnu had taken his abode in the womb of a woman, the planetary bodies moved in brilliant order in the heavens, and the seasons were regular and genial; the virtuous experienced new delight, the strong winds were hushed, and the rivers glided tranquilly, when Janârddan'a was about to be born. The surprising adventures of Krishna are told at great length, and they form the groundwork of the tenets of a particular class of the Vaishn'avas, or worshippers of Vishnu.

There are several annual festivals of Vishnu in India. Of those in Bengal and Orissa, the Ratha-yâtra, or procession of Jagannâtha in his car, is the most celebrated. This festival is rarely held in Upper India, and then only by natives of Bengal.

VISIBLE SPEECH. A system of letters applicable to the writing of all languages in one alphabet. The title of the system is derived from the fact that the shapes of the letters are explanatory of the organic mechanism of their sounds. This peculiarity enables readers who are acquainted with the principle of the alphabet to pronounce foreign and unheard sounds at sight of their symbols. The object of the invention is not to supersede the Roman or other alphabets, but to furnish a *key* to the letters made use of in different countries, and a medium in which every language may be expressed with universal legibility and uniformity. The system was offered gratuitously to the British government, on condition that the expense of casting the new types and publishing the theory of the 'Science of Universal Alphabetics' should be defrayed from public resources. The offer was not accepted, and the system

has now been published, as an ordinary copyright, by its author, Mr. A. Melville Bell, Lecturer on Elocution in University College, London.

The Universal Alphabet includes fifty-two consonants, thirty-six vowels, and twelve glides; but by means of diacritic signs this number of elements is capable of almost indefinite extension, so that the minutest *shades* of sound may be represented, and writing may be made, when desired, an exact *fac simile* of utterance, however tinged with dialectic or other peculiarities. The utility of such a system in enabling learners of foreign languages to master their pronunciation from books is sufficiently obvious; and the application of the method to international telegraphy gives promise of a wide field of general usefulness. It is asserted that the deaf and dumb may be readily taught to speak by means of these physiological letters; and that illiterate adults may learn to read their native tongue in a few days.

The whole system is built up from the rudimental symbols exhibited in the annexed diagram:—

The lines of curvature of the *back* of the tongue, the arched *front* of the tongue, the raised *point* of the tongue, and the *lip*, furnish the primary symbols for consonants; and these 'organic curves' enter into the composition of all letters for consonants formed at these various parts of the mouth.

The sign of *voice*, a straight line—symbolizing the narrow aperture of the glottis—is the 'stem' of all vowel letters; and to this 'definers' are added, which show with precision the organic adjustments by which the sounds are modified. Vowels and consonants have thus a radical difference of outline, which at once meets the eye and informs the reader of the number of *syllables* in every word.

Consonants are divided into four classes—Primary, Divided, Shut, and Nasal—and of each class there are four complete sets, formed on the basis of each of the 'organic curves.' The sign of 'voice' added to the resulting letters further distinguishes *vocal* from *non-vocal* consonants, while the relation between the various pairs of elements is preserved in the uniformity of their symbols.

Vowels are divided into two classes—Primary and Wide—and of each class there is a complete set formed

at three parts of the mouth, the 'back' of the tongue, the 'front' of the tongue, and the 'mixed' back and front of the tongue. A sign for *labial* modification added to each of the resulting letters forms a duplicate set of 'round' vowels, the organic relation of which to the lingual vowels is thus exhibited in the uniform outline of the letters.

'Glides' are classified in the same way. The discrimination of these elements as a distinct variety is one of the new theories of the system. Glides added to vowels form *diphthongs*, or monosyllabic double sounds, some hundreds of which compounds are expressible by the symbols.

Notwithstanding the vast number of sounds for which the system provides distinct graphic signs, the number of *radical* symbols is exceedingly small, being no more than twenty-eight, including tones as well as articulate sounds.

The typography of the system is correspondingly simple and economical of forms, each type being reversible so as to print two letters. In the CAPITAL form of the alphabet—the only one that has been cast as yet—the consonant types print *four* letters each. The total number of types required to print the Universal Alphabet is sixty. This includes diacritics of all kinds. The English language requires but little more than half that number, or, including marks for quantity and accent, *thirty-five* types.

The English phonetic elements discriminated by Mr. Bell amount to fifty-two, as heard in the *italicized* parts of the following words:—

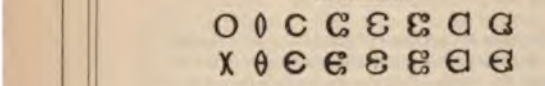
Consonants: ne*ck*, le*g*, i*nk*, *sing*; *y*es; li*t*, li*d*, li*nt*, li*nn*, wri*t*, hi*lt*, hi*ll*; *s*eal, *z*eal, *th*in, *th*en; bu*sh*, rou*ge*; *c*ap, ca*b*, lam*p*, lam*b*, *f*ine, vine; *wh*ey, *w*ay; *h*ay.

Vowels: men*t*ion, *u*p, *a*sk, *a*rm; *e*el, *i*ll, *a*le, *ai*r, *e*ll, *a*n; places, fat*a*l, *i*r; p*oo*l, p*u*ll, *o*ld, *o*re, *a*ll, *o*n; pleas*u*re, orat*o*r.

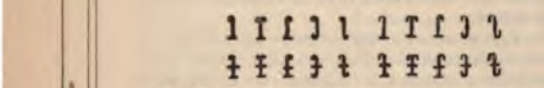
Glides: w*ea*ry-fi*e*ry, &c.; di*e*-d*ay*-b*oy*, &c.; *ear*-*air*-*ore*-*your*, &c.; th*ou*-c*ow*-kn*ow*, &c.

These various shades of sound, and many others, are distinctively printed from the following types, which constitute the complete alphabet of consonants and vowels.

CONSONANTS.



VOWELS.



(For the details of this invention we refer our readers to the inaugural volume; or to a smaller and more popular work limited to 'English Visible Speech,' from which the precise nature of the system may be more readily understood.)

VISITATION, HERALDIC, a commission occasionally issued by the crown in order to determine the armorial bearings and pedigrees of the English nobility and gentry. The commissioners were usually the royal heralds, Clarencieux and Norroy, kings-at-arms, who visited different places within their respective provinces once every thirty or forty years. The first visitation took place in 1528–29, and included the counties of Berks, Gloucester, Oxford, Sussex, Wilts, and Worcester. Its record is preserved in the College of Arms. The latest was held under a commission issued by James II. May 13, 1686, and extended over a period of eight years. The registries of these visitations in the College of Arms, the Bodleian Library, and British Museum are the principal sources of heraldic information extant for England. A visitation appears to have been held in Scotland about 1673–74.

VISMIA, a genus of plants belonging to the natural order *Hypericaceæ*, named after M. de Visme, [illegible]. *V. Guianensis* is a small tree with a stem [illegible] feet high. The bark when wounded yields a [illegible] which when dry becomes hard, and resembles [illegible]. The leaves and fruit likewise yield a similar [illegible].

VISTULA (*Wisła*, *Weichsel*), the principal river of Poland, rises in the Carpathian mountains [illegible] Silesia, at the height of about 2000 feet above the sea, flows first N. to the boundary of the province, then turning nearly E., it enters Poland [illegible] Cracow. Leaving this place it flows N. [illegible] Poland from Galizia as far as Sandomir, where [illegible] N. to Warsaw, a few miles below which [illegible] north-westerly course till it leaves the Polish [illegible] and enters Prussia a little above Thorn. [illegible] miles W. from this town, the river flows in [illegible] of N.N.E. to the Baltic. Before it reaches [illegible] divides below Marienwerder into two branches, the smaller of which, called the Nogat, discharges into the Frische-Haff by about twenty miles. The larger or western branch, after flowing about [illegible] farther, again divides into two branches, the [illegible] which turns E., and empties itself into the Haff by a new channel which it forced for itself [illegible] and the main stream, taking the opposite direction [illegible] ters the Baltic at Weichselmünde, 3 miles N. of [illegible]. The branches that enter the Frische-Haff form [illegible] deltoid islands. In its course through Poland the Vistula is joined on the left by the Nida, the Pilica, and the Bzura; on the right by the San, one of its largest affluents, which drains a considerable portion of Galizia, and enters the Vistula near Sandomir; and the Bug, the largest of all its tributaries, which also rises in Galizia, and flowing for a considerable distance along the eastern frontier of Poland, turns W., and falls into the Vistula near Warsaw, having received in its course many rivers, among others the Narew, at a short distance from its junction with the Vistula. The whole course of the Vistula is about 550 miles, and it is navigable for large barges from Cracow to the sea. The Bromberg Canal connects it with the Oder. The Vistula, being joined with so many navigable rivers, and flowing chiefly through a level country, is a great channel for the conveyance of the corn and timber of Poland, from the interior of the kingdom to the Baltic ports, especially to Danzig. At its junction with the Bug stands the important fortress of Modlin. At Warsaw the river is commanded by Alexander's citadel.

VISUAL ANGLE, in Optics, the angle under which an object is seen, or the angle formed at the eye by the rays of light proceeding from the extremities of the object. The lines of light from an object which enter the eye are called *visual rays*.

VITA'CEÆ, or VINI'FERÆ, a natural order of plants belonging to Lindley's albuminous group of polypetalous Exogens. It includes six genera, which for the most part inhabit the warmer parts of the north temperate zone, and are found in both the Old and New Worlds. Most of them are natives of Asia, one of Australia, and none of Europe. Their most characteristic property is acidity, which is most fully deve[loped]

the Grape-vine. [VITIS.] The acid present is chiefly the tartaric, but malic acid has also been found. In addition to the acid, sugar of a peculiar kind is present, and is called Grape-sugar. Some of the species of *Cissus* are used in medicine. The genus *Ampelopsis* is intermediate between Cissus and Vitis. The species are found in North America, the north of Africa, China, and the Himalayas. They are all climbing shrubs, of easy propagation and culture, and are very ornamental. The species of the genus *Leea* are large rough shrubs, with cymes of small greenish or yellow insignificant flowers. It cannot be said that any of them are worth cultivating.

VITEBSK (*Witebsk*), a government of European Russia, which, together with Mohilev, fell to the share of that empire at the first partition of Poland in 1772, is bounded N. by Livonia and Pskow, E. by Smolensk, S. by Mohilev and Minsk, and W. by Courland. Its area is 17,145 square miles, and the population is 804,573, many of whom are Roman Catholics.

The surface presents a vast plain, almost without hills, diversified only by the banks of the rivers, which rise a little above the general level. The soil is sand mixed with clay, and with a very thin covering of vegetable mould. The principal river is the DUNA, sometimes called Dwina, which forms a great part of the western boundary, and receives numerous small feeders on its right bank. There is a great number of lakes, but none of any considerable size: the largest is that of Lubahn, on the frontier of Livonia. The abundance of water causes the climate to be damp; but it is temperate, and not very variable. Agriculture is the chief occupation of the inhabitants, who cultivate rye, wheat, barley, oats, pulse, flax, hemp, and hops. The soil, however, is not fertile and there is not usually sufficient corn grown for home consumption. Flax and hemp succeed very well, and form considerable articles of export. Horticulture is pretty well attended to; but there is no cultivated fruit except cherries. The bird-cherry is very common, as well as all sorts of wild berries, bilberries, cranberries, &c. The immense forests of pine and other trees afford employment to many of the inhabitants in felling and squaring timber. The pasture lands are very extensive, and horned cattle and horses are bred in great numbers, but the former are small in size; the horses are partly of the strong Russian race and partly of the light Polish breed. There are large flocks of coarse-woolled sheep; goats, swine, poultry, and bees are abundant. The lakes and rivers abound in various kinds of fish, especially smelts, of which immense quantities are dried and exported. The minerals are iron ore, freestone, lime, marl, and fuller's earth. The manufactures, with the exception of tanning, are unimportant; but some glass, earthenwares, and woollen cloths are made. The commerce of the government is greatly facilitated by the Düna, and the Berezina Canal, which connects the Düna and the Dnieper. Large quantities of timber are floated down the Düna to the port of Riga. The principal exports are flax, hemp, dried fish, corn, flour, bristles, horses, timber, masts, linseed, oxen, wool, hides, tallow, honey, and wax.

Vitebsk, the capital of the government, is situated on the Düna, at its confluence with the Viteba, in 55° 6′ N. lat., 30° 5′ E. long., and has about 28,000 inhabitants. It is surrounded with ancient walls and towers. The part of the town on the left bank of the Düna is the most considerable; beyond the Viteba is the old castle, surrounded with a very lofty rampart, and handsome buildings. The streets are narrow and irregular, and there are only a few stone houses. One of the finest edifices is the Greek convent of St. Basil. There are several churches, monasteries, synagogues, hospitals, poor-houses, an orphan asylum, and a large bazaar. There are also some woollen manufactures and tanneries in the town, and a good trade is carried on in corn, flax, hemp, tobacco, sugar, and timber, much of it by Jews, who form a large part of the population. The commerce is chiefly with Riga, Memel, Danzig, and St. Petersburg. Vitebsk has recently been connected by railway with the first-named port. The Grand Duke Constantine, brother of Alexander I., died here in 1832. The town is also famous as being the place of which Napoleon remarked on his advance into Russia in 1812, 'Do you think I have come so far to conquer these miserable huts?' and then changed his first determination to halt there for the winter, for which preparations had already been made, and pushed on to Moscow. *Welisch* (*Wieliz*), a town with 11,000 inhabitants, further up the Düna, also has a considerable trade with Riga in the produce of the country. It was founded by the Russians in 1536, and taken by the Poles in 1580; but it reverted to Russia in 1772. *Polotzk*, one of the most ancient towns in Russia, being mentioned in the Scandinavian traditions, stands 60 miles N.W. of Vitebsk, near the right bank of the Düna, and has about 15,000 inhabitants. It is slightly fortified, but the citadel has fallen into decay. It is the seat of an archbishop of the Greek United Church, has a kremlin, a district school for the sons of nobles, and several Greek and Roman Catholic churches. The handsomest building in the town is the former college of the Jesuits, with a very beautiful church. There is a harbour, and some tanning is carried on. Polotzk was taken by the Russians from the Poles in 1579, and again in 1655.

VITE'LLIUS, AULUS, was of a noble family, of luxurious habits, and fond of the pleasures of the table. He enjoyed the favour of three successive emperors, Caligula, Claudius, and Nero. He was made consul in A.D. 48. After Galba had been elevated to the imperial dignity, in A.D. 68, he ordered Fonteius Capito, the commander of the legions in Germany, to be put to death, and appointed Vitellius in his stead. Galba was unpopular with the soldiers. Vitellius, on the other hand, attached to himself his troops by liberal gifts, and by still more liberal promises; and at the beginning of A.D. 69 he was proclaimed emperor. Soon after the arrival of this news at Rome Galba was assassinated, and Otho was proclaimed emperor (January 15, A.D. 69). Vitellius sent two of his generals to occupy the Pennine Alps and the part of Italy north of the Po (Gallia Transpadana). Otho marched against them, and met the enemy near Bedriacum; but his army being defeated, he put an end to his life about the middle of April. His soldiers recognized Vitellius as emperor, and he came to Rome. He had scarcely arrived there when Flavius Vespasianus, who was then engaged in the war against the Jews, assumed the imperial dignity, and was proclaimed emperor on the 1st of July, at Alexandria, by Tiberius Alexander, the prefect of Egypt. Vespasian was recognized by the legions in Judæa and Syria, and also by those of Mœsia and Pannonia. Antonius Primus, the commander of the latter, marched into Italy without waiting for the commands of Vespasianus. Vitellius was betrayed by his own general, Cæcina; and his army, though superior in numbers to that of the enemy, was routed in an

silks, shoes, and hats. The French occupied Vitoria from 1808 till they were driven out of it by the British, June 21, 1813. The Anglo-Spanish army was commanded by the duke of Wellington, and the French by King Joseph and Marshal Jourdan. Though there was not much difference in the loss of men on either side, the French were totally defeated, lost all their baggage, ammunition, and stores, and were compelled to retire from Spain.

VITREOUS HUMOUR, that is, *glassy* humour, is the third or interior humour of the eye, occupying a large portion of the eyeball, and greatly exceeding in quantity both the aqueous and crystalline humours. Its refractive power is estimated at 1·3394.

VITRIFIED FORTS are certain remarkable inclosures of stones existing in various parts of Scotland, especially in Inverness-shire. They are constructed of stones piled rudely upon one another, and firmly cemented together by some material which has been vitrified by fire, the stones themselves being also partially vitrified. They generally surround the top of some steep conical hill, and are supposed to have been intended for defensive military posts. Various hypotheses have been framed to account for the vitrified appearance of these structures, but it seems most reasonable to suppose that the material of which they are built was selected with a view to its capability of being vitrified; for the stones that have been most commonly used are granite or moorstone limestone, sandstone and pudding stone, all of which are more or less easily fusible by fire, and the process of vitrifaction may have been rendered easy by the quantities of wood which in early times covered the Highlands.

VITRINA (Lat. *vitrum*, 'glass'), a genus of freshwater gastropods, which owe their name to the peculiar glassy or sea-green colour, and the exceeding thinness of its shell. Two species, *V. pellucida* and *V. elongata*, are natives of the British isles.

VITRIOL, BLUE. [Copper.]

VITRIOL, GREEN. [Iron.]

VITRIOL, WHITE. [Zinc.]

VITRIOL, OIL OF. [Sulphur.]

VITRU'VIUS PO'LLIO, MARCUS, a Roman architect, well known for his work 'De Architecturâ,' in ten books. His history is known only by what he casually says of himself in his treatise. He is noticed only by two ancient writers: by the elder Pliny, who enumerates him among the writers from whose works he compiled; and by Frontinus, in his treatise on aqueducts, 'De Aquæductibus,' who mentions him as the inventor of the Quinarian measure. Neither the time nor the place of his birth is known, but he is generally supposed to have been born at Formiæ (Mola di Gaeta) in Campania, from several inscriptions relating to the Vitruvia family which have been found there. As he dedicated his work to the Emperor Augustus when he was already old, and as it was written before the theatres of Marcellus and Balbus were built, which was in the year 13 B.C. (for when Vitruvius wrote, the theatre of Pompey was the only stone theatre in Rome), it follows that he must have been born about 80 B.C., or a little earlier. From what he says in the prefaces to his third and sixth books, it would seem that he was not very successful in his profession; he executed only one public work that is mentioned, a basilica at Fanum. He was, however, at the time that he wrote, one of the superintendents of the engines of war, the others being Marcus Aurelius, P. Numisius, and Cn. Cornelius. He states that he had received a good education, and was fond of literary and philosophic subjects; that riches were no object with him, and that he was possessed of very little, but that he hoped to acquire a reputation with posterity for the treatise he was then writing. He mentions in the preface to his seventh book the architectural writers to whom he was chiefly indebted for information.

There have been many editions of Vitruvius: the editio princeps was printed, without date or name of printer or place, about 1480, at Rome, by George Herolt, in folio, under the superintendence of Sulpitius. The best edition is that published by Schneider, at Leipzig, in 3 vols. 8vo, 1807, but it is without plates.

There are translations into French, Spanish, Italian, German, and Dutch. It was translated into English by W. Newton, in 1771–91, with plates, folio, London; by W. Wilkins, R.A., in 1812, 'The Civil Architecture of Vitruvius,' in two parts, 4to, being a translation of the third, fourth, fifth, and sixth books only, but the text is not entire, and the introductions are omitted; and in 1826, in royal 8vo, by Joseph Gwilt, London.

VITRY. [Seine.]

VITTÆ, in Botany, a term most frequently applied to the receptacles of oil which are found in the fruits of Umbelliferous plants.

It is also sometimes applied to the various stripes which are found upon leaves, and which either arise from irregular distribution or entire deficiency of colouring matter in the tissues of the leaves of plants.

VIVA, an exclamation of applause or joy used in Italy, and similar in meaning to hurra or hurra in English, and to *vive* in French.

VIVARAIS, LE, a province in France, formerly included in Languedoc, and lying chiefly between the Rhône and the main ridge of the Cévennes from Mont Lozère on the south, to a little north of the town of Annonay. This portion of it now forms the department of Ardèche. The remaining part of Vivarais extended W. of the Cévennes, and now forms the south of the department of Haute-Loire. The capital of the province was Viviers. [Ardèche.]

VIVERRA. [Viverridæ.]

VIVE'RRIDÆ, a family of carnivorous Mammalia, including the Civets (*Viverra*), the Genets (*Genetta*), the *Paradoxures* (*Paradoxurus*), the *Prionodontidæ*, the *Cryptoproctæ*, and many other forms, such as the Ichneumons (*Herpestes*), the Mangues (*Crossarchus*), and the Suricates (*Ryzæna*).

Destined for a life of rapine, the *Viverridæ* are active and vigorous. In general the body is rather elongated, the head somewhat conical, the muzzle often acute, the eyes oblique, and the tongue rough with retrovert horny papillæ. In most groups the feet are digitigrade, in some semi-plantigrade. Many are remarkable for strongly-scented musky secretion, prepared in certain glandular sacs. Nocturnal or crepuscular in their habits, they emerge from their retreats at the close of day, and then begin their prowl in quest of food. Although of restless, wild, and savage temper, they are by no means destitute of intelligence, and are even capable of being domesticated.

We may notice the following genera:—

1. *Viverra*, the true Civet. Musk pouch consisting of two sub-anal sacs; pupil round; claws semi-retractile.

Incisors, $\frac{6}{6}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{6-6}{6-6} = 4$

The true Civets, to which the genus *Viverra* is restricted, yield in the extent of their carnivorous propensities to the cats alone, which they approach

closely in many points of their zoological character, as well as in their predatory, sanguinary, and nocturnal habits. In addition to the six incisors and two canines, which are common to the whole of the true *Carnivora*, they have on each side and in each jaw six molars, one of which is peculiarly adapted for lacerating flesh, while the rest are more or less of the ordinary form. Their tongues are furnished with the same elevated and pointed papillæ which give so remarkable an asperity to those of the cats, and their claws are half retractile. The toes are five in number on each of their feet, and their extremities alone are applied to the ground in walking; the animals are consequently completely digitigrade. But the most distinctive character of the group consists in an opening near the tail, leading into a double cavity of considerable size, furnished with glands and follicles for the secretion of the peculiar odoriferous substance so well known as the produce of the civet, and from which the animal derives its name.

The Civet (*Viverra civetta*) is a native of north Africa. It approximates to the cat in its habits, and preys upon birds and small quadrupeds.

In a state of captivity it becomes in a degree tame, but never familiar, and is dangerous to handle. The young are fed on farinaceous food, millet-pap, for instance, with a little flesh or fish; and, when old, on raw flesh. Many of them are kept in north Africa to obtain the perfume which bears the name of the animal, and brings a high price. The civet is procured by scraping the inside of the pouch with an iron spatula at intervals about twice a week. If the animal is in good condition and a male, especially if he has been irritated, a dram or thereabouts is obtained each time. The quantity collected from the female does not equal that secreted by the male. Civet, like most other articles of this nature, is much adulterated, and it is rare to get it quite pure. The adulteration is effected with suet or oil to make it heavier.

To this genus belong the following species:—the Zibet (*Viverra zibetha*), the Musang (*Viverra musanga*), and the Rasse (*Viverra rasse*), of Sumatra.

2. *Genetta.*—Odoriferous pouches reduced to a slight depression formed by the projection of the glands, and without any perceptible excretion, although the odour is manifest. The pupil has a vertical slit, and the claws are entirely retractile, as in the cats.

Example, *Genetta vulgaris*, the common Genet, *Viverra genetta*, Linn. Gray, spotted with small black or brown patches, which are sometimes round and sometimes oblong; the tail, which is as long as the body, is ringed with black and white, the black rings being to the number of nine or eleven. There are white spots on the eyebrow, the cheek, and on each side of the end of the nose.

Cuvier states that this species is found from the south of France to the Cape of Good Hope, and says that it differs in the size and number of the patches, the bands along the shoulder and neck, the lines on the nape, &c.

The Genet loves lowlands, particularly the banks of rivers and the neighbourhood of springs. In Constantinople it is domesticated, and kept in the houses, where it is said to catch mice as well as a cat.

3. *Paradoxurus.*—Generic character generally that of the Civets and Genets. Tail capable of being rolled from above downwards to its base, but not prehensile. Toes five, nearly palmated; sole of the foot tuberculous, applied throughout its surface to the ground; claws semi-retractile. Eyes with the pupil slit longitudinally. No pouch.

Example, *Paradoxurus typus.*—The Paradoxure in form and habits does not differ much from the Genets, and the toes and claws closely agree in number and retractility. The tail is very peculiar; as long as the body and depressed, not to say flattened, above and below; the extreme or more distant half is, when extended, turned over, so that the lower side is uppermost, and the animal can roll it up spirally from above downwards, and from the extremity to the base. The Paradoxure inhabits the large islands of Asia.

4. *Ichneumon.* [ICHNEUMON.]

5. *Ryzæna.*—Feet rather long; toes four, armed with robust but not retractile claws proper for burrowing. Tongue furnished with horny papillæ. Ears small. Pouch leading into the anus. Tail long, slender, and pointed.

Example, *Ryzæna Capensis*, the Suricate. This animal is a native of South Africa. It closely resembles the ichneumon in its habits. Length about 4 feet.

6. *Crossarchus.*—Muzzle, teeth, pouch, and walk of the suricates; feet as in the ichneumons.

Example, *Crossarchus obscurus*, the Mangue. This animal is a native of Africa, and closely resembles the ichneumons in general habits.

7. *Cryptoprocta.*—This genus is supposed by some authorities to be closely related to the cats, the affinity being indicated both by anatomy and external characters.

Example, *Cryptoprocta ferox.*—Locality, Madagascar. Ferocious, sanguinary, and very active.

8. *Nasua.*—The genus *Nasua* belongs rather to the *Ursidæ* than the *Viverridæ*, and is closely related to that of the raccoons.

The species of this genus, commonly called Coati, or Coati-mondi, are natives of South America, where they inhabit the woods, feeding on roots, fruits, reptiles, insects, and occasionally birds. They climb with great agility, and are sometimes seen congregated in small bands. They are remarkable for the length and mobility of the snout, which projects considerably beyond the lower jaw, and terminates in a sort of disc, where the nostrils open. The eyes are small; the ears rounded; the body long and deep; the toes are five on each foot, armed with powerful claws. Tail long, and ringed alternately with dark and pale tints. The canine teeth are remarkable for their size and sharpness, especially those of the upper jaw, which are compressed, and have a cutting edge both before and behind.

Linnæus placed the Coatis among the *Viverræ*; but they differ in dentition from the true *Viverræ*, and have no scent pouch.

In drinking the Coati laps like a dog; but as its long snout would be in the way during this operation, it turns it up so as to prevent its being submerged. Habits greatly but not exclusively nocturnal. In captivity it is savage and capricious; when attacked it defends itself vigorously, and utters a shrill cry.

Example, *Nasua fusca*, the Brown Coati; and *Nasua rufa*, the Red Coati. Total length, including the tail, 3 feet 6 inches. Colour subject to variation in its intensity. Both species are common in menageries.

VIVIANA'CEÆ, a natural order of plants, of which the *Viviania* is the type; so named in honour of Dr. Viviani, a botanist of Genoa. They are inhabitants of Chili and Brazil, and are very pretty shrubs, the flowers of which are of a red and white colour.

VIVIANITE, or *blue iron earth*, named after Mr. J. G. Vivian, the celebrated English mineralogist, is a native hydrated phosphate of iron, of a greenish or deep blue colour, darkening on exposure to the atmosphere,

and composed of 28·75 parts of phosphoric acid, 42·27 of protoxide of iron, and 28·98 of water. It is found in very oblique prisms, frequently globular and reniform.

VIVIPAROUS (Lat. *vivus*, 'alive,' and *parire*, 'to bring forth'), in Zoology, a term applied to those animals which bring forth their young in a living and perfect condition, and generally completely free from their external or shell coverings. Such is the case with all mammals, with several reptiles, numerous invertebrate animals, and not a few fishes.

VIZIR, or VIZIER, is the name of the ministers of the sultan of the Turkish empire, and is also given as a title of honour to several other high functionaries, civil as well as military. Among the Turks, all the pachas of three tails, that is, the highest pachas, receive this title. The word is of Arabic origin, and means literally 'the bearer of a burden,' as *vezr* designates 'the action of bearing or carrying a burden.' The lieutenant of a king was called vizír by the Arabs long before this title was adopted by the Turks-Osmanlis. At first there was only one vizír, but the number was gradually augmented.

VLAARDINGEN. [HOLLAND.]

VLADIMIR, a government of European Russia, lying between 54° 58′ and 57° 11′ N. lat., 37° 42′ and 43° 20′ E. long., is bounded N. by Twer, Yaroslaw, and Costroma, E. by Nijni-Novgorod, S. by Riäsan, and W. by Moscow. Its area is 18,238 square miles, and the population in 1866 was 1,223,000. The face of the country is an undulating plain, diversified by low hills and by extensive forests on the borders; there are also many heaths and morasses.

The principal river is the Oka, which traverses the south-east of the government. It is joined by the Kliazma, which comes from the government of Moscow, crosses this province nearly in the middle, and joins the Oka in Nijni-Novgorod. Both rivers are navigable, and are much availed of during the summer in transporting the produce and manufactures of the country, as they communicate direct with the Volga. Among the numerous lakes, the two largest and most remarkable are the Peganowoe, in which floating islands are sometimes seen; and the Plestschejew about 5 miles long and 4½ broad, and celebrated on account of the nautical exercises of Peter the Great. It was, in fact, the cradle of the Russian fleet.

The rivers freeze about the middle of November, and thaw in March. The winter is very cold; the summer very hot; the spring and autumn variable; night frosts do not cease till May, and recommence at the end of September. Agriculture is the chief occupation of the inhabitants; but the heaths, marshes, sandy tracts, and forests, cover so great an extent of surface, that the produce of the harvest is not sufficient for the home consumption. Wheat, rye, barley, oats, millet, peas, garden vegetables, hops, apples, and cherries, are cultivated. Hemp is a very successful crop, and is exported in large quantities to Archangel and St. Petersburg. Wild berries of various kinds abound. Game, except hares and partridges, is rare; but bears, wolves, and lynxes, are still met with. The number of horned cattle is merely sufficient for the wants of the province; the breed of horses is excellent. In the forest of Murom are valuable iron mines; and the other minerals are alabaster, potter's clay, and freestone. The principal manufactures are those of linen and cotton cloth, leather, iron and brass wares, paper, chemicals, glass, and crystal. After those of Moscow and St. Petersburg, the government has more extensive manufactures than any other in Russia, the sterility of the soil compelling the inhabitants to resort to industrial activity. There are some of the largest iron works in the empire at Vixa, on the Oka. The articles exported are the above-mentioned manufactures, soap, and potashes; also fruit, timber, fire-wood, building stone, millstones, and lime.

Vladimir, the capital, situated in 56° 17′ N. lat., 40° 20′ E. long., is built on a group of hills in a fertile plain, on the left bank of the Kliazma, and in 1866 had 12,248 inhabitants, including many Jews. It is one of the oldest cities in Russia, and from 1157 to 1328 was the capital of Great Russia. There are still some remains of the fortifications, but with the exception of its numerous churches and stone houses, Vladimir has now few other traces of its former greatness. The town is large, but ill built, and has six gates, terminating six principal streets. Of the twenty-five churches, the cathedrals of St. Mary and Demetrius are remarkable in the history of Russia. There are two convents, an ecclesiastical seminary, and several government buildings. The town is the see of the bishop of Vladimir and Susdal. The manufactures are cotton, linen, leather, and soap. There is also a trade in corn and cherries, the latter being grown in the neighbourhood in very large quantities. Vladimir is 120 miles E. from Moscow, and the road between the two cities through a succession of populous villages. They are now also connected by railway. *Pereslawl-Zalesi*, situated at the entrance of the Trubesch into the Plestschejew, is an old ill-built town 70 miles N.W. of Vladimir, but a large number of churches and convents give it a striking appearance. The population is 6,000, who manufacture cotton goods, linen, silks, and woollen cloths, and carry on a profitable transit and commission trade. Altogether there are nine large factories in the town, which annually produce goods valued at 3,000,000 roubles. The cotton fabrics are exported to the fairs of Nijni-Novgorod and Irbit. In addition to the manufactures, some of the inhabitants are employed in the fisheries on the lake, which are very productive. *Murom*, with 10,500 inhabitants, is an ancient town, 70 m. E.S.E. of Vladimir, on the right bank of the Oka. It comprises a kreml or citadel, a cathedral, many other churches, convents, and several crown buildings. The inhabitants carry on manufactures of linens, leather, sail-cloth, soap, and earthenware. The latter is exported in considerable quantities to St. Petersburg. In the vicinity of the town are some very extensive orchards and kitchen gardens, producing the finest cucumbers in Russia, the seed of which is exported to all parts of the empire. Near Murom are also some gypsum quarries, the produce of which is sent in large quantities to Petersburg and Moscow.

VLIESSINGEN. [FLUSHING.]

VOCHYA'CEÆ, or VOCHYSIA'CEÆ, a natural order of plants belonging to Lindley's parietose group of polypetalous Exogens. The forty species belonging to this order are trees. They are all natives of southern America, where they are found inhabiting the forests, the banks of streams, and sometimes the sides of mountains to a very considerable elevation. None of them are remarkable for their beauty or uses, but the striking irregularity of the structure of their flowers renders them objects of great interest to the botanist.

VOGEL, DR. EDWARD, an astronomer and traveller, was born at Leipzig in 1829. Here he was educated, and studied astronomy at Berlin, under the celebrated Encke. He was one of the number chosen to make scientific observations in Central Africa in 18

57. He succeeded in penetrating into the interior, across the great desert, and visited Yacoba in 1855. But in 1856 the British government received intimation of his death; and this melancholy event was afterwards fully confirmed. He was beheaded by order of the sultan, at Wara, the capital of Wadai.

VOGHE'RA, a district of northern Italy, lies mostly in the plain of the Po, but the southern part of it stretches over the northern slope of the Ligurian Apennines, from which the Staffora and other torrents descend and cross the plain to join the Po. It produces much silk. The chief town, *Voghera*, has 14,000 inhabitants; it is an uninteresting place; the only building in it worth notice is the collegiate church, which is of good architecture. There are some squares and an old castle of the fourteenth century. The town is built on a plain on the high road from Turin to Piacenza, and has manufactures of silks, linens, canvas, and leather. The vicinity is very fertile, and produces grapes, corn, and fruit in abundance. The town is 19 miles E.N.E. of Alessandria. Roman antiquities have been found near it. *Stradella*, on the high road from Voghera to Piacenza, 10 miles S.E. of Pavia, and near the Po, has 7000 inhabitants. It is situated on the slope of a hill, and was formerly strongly fortified by the bishops of Pavia. There are some small manufactures of cotton and silk.

VOICE. The voice (from the Latin *vox*) is an audible sound produced in the larynx.

Song-voice.—The scale of the human voice, from the lowest note of the bass to the highest of the soprano, within which limits composers write vocal music, is four octaves, viz., from *mi*, E, in the bass clef to *mi*, E^4, in the treble clef. There have been instances, but they are very rare, of voices capable of descending lower, and others of ascending higher than those limits. This scale of sounds is divided into *voce maschile* ('male voice'), which extends from *mi* (E) in the bass clef to *do* (C^3) in the treble clef; and *voce feminile* ('female voice'), which extends from *fa* (F^1) to *mi* (E^4) in the treble clef.

The lower or male-voice part of the scale is subdivided into bass and tenor, each containing two octaves: the bass extends from *mi* (E) to *fa* (F^2); and the tenor from *do* (C^1) to *do* (C^3).

The upper or female-voice part of the scale is subdivided into contralto and soprano, each also containing two octaves. The contralto extends from *fa* (F^1) to *fa* (F^3); and the soprano from *do* (C^2) to *mi* (E^4).

These are the four scales within which musicians compose vocal music for each class of voice.

Intermediate between the bass and tenor is another male voice, extending from *la* (A) to *fa* (F^2) and termed the barytone. Between the contralto and the soprano also is another female voice, extending from *la* (A^1) to *la* (A^2), and termed the mezzo-soprano. The voices of eunuchs and boys are classed with those of females.

It is thus obvious that the scales of the several voices overlap each other in the great compass of the human voice. Thus the bass overlaps the tenor eleven notes, so that the tenor descends to within five notes as low as the bass; while the bass ascends to within four notes as high as the tenor. Eleven notes are common to both bass and tenor scales, and any music whose variations of pitch are within the range of those eleven notes can be sung either by a tenor or a bass voice. A tenor reaches to within three notes as high as the contralto compass, and midway up the soprano, giving twelve notes common to the tenor and contralto scales, and eight notes common to the tenor and soprano scales, which explains the wide range of music which tenor voices can sing.

The ordinary compass of a voice is about twelve notes. Many singers' voices, however, extend to two octaves; some even beyond two, and a very few have reached three octaves. Catalani's is said to have been three and a half.

The compass of soprano and some other voices are divided into registers, of which there are two, viz., the natural and the falsetto. The former is termed in the Italian school *Voce di Petto*, or 'chest voice;' and the latter *Voce di Testa*, or 'head voice.' To these the Italians add another which joins the two registers, and which somewhat partakes of the character of both; it is named the *mezzo falso*, or middle falsetto. Each person's voice has a distinct quality or tone (*timbre* of French authors), by which it is recognized, even when singing in unison with others.

The song note is a musical sound of some fixed pitch in the scale. When a clear resonant voice produces it, the accompanying harmonic sound may be heard just as it is with the sound of a vibrating string.

Speech-voice.—The speech-note is not a true musical sound, because its pitch varies throughout its duration. These notes are termed slides, accents, and inflections; and they may be imitated on the violin by sliding a finger up the finger-board while the bow is applied. The notes may have an ascending or descending course in pitch, and sometimes they have both on a syllable. The varying pitch of a speech-note will be illustrated if the reader, with an intense feeling of inquiry, utter aloud Hamlet's interrogatory, 'Pale, or red?' The speech-note on the word 'pale' will consist of an upward movement of the voice; while that on 'red' will be a downward movement, and in both words the voice will traverse so wide an interval of pitch as to be conspicuous to ordinary ears; while the cultivated perception of the musician will detect the voice moving through a less interval of pitch while he is uttering the word 'or' of the same sentence. He who can record in musical notation the sounds which he hears, will perceive the musical interval traversed in these vocal movements, and the place also of these speech-notes on the musical staff.

Several of the rhetoricians of antiquity speak of the changes of pitch of the voice seldom exceeding a fifth on any one syllable. This is true, though higher intervals are used, even up to the octave, but very sparingly, and the fifth itself is of less common occurrence in oratory than the third.

Speech melodies seldom exceed the limits of an octave and a half. Whatever the speaker's key note may be, he seldom rises more than a fifth above it, or descends more than a fifth below it in pitch. A person's key note is generally somewhat below the middle of his compass; which circumstance enables most speakers to ascend an octave if required for the purpose of expression.

The voice, whether united or not with verbal language, is expressive of the feelings. It is the language of the feelings, by which they manifest themselves to the ear without previous teaching; and when heard, are recognized and felt without teaching. The scream of terror, the shout of joy, the laugh of satisfaction, of sarcasm, or of ridicule, are made by man, and understood by his fellow-man, wherever the one may be born, or whatever may be the speech of the other. The voice is a natural and universal language. Each mental attribute has its voice, which is in relation to that attribute; and whether that attribute forms part of the mind of man or brute, it instantly recognizes the voice. The changes of pitch

present the most remarkable changes in the voice; and on these mainly depend the expression of the feelings. The mind adopts changes of pitch to express its condition, and the interval of music is but a means of measuring, and thence imitating that expression. A higher intensity of feeling increases the interval, a fact well known to composers, who have largely availed themselves of it in dramatic music. The pages of Handel, Mozart, Beethoven, Weber, and Rossini, are full of illustrations of it. The 'Messiah,' the greatest of all musical compositions, abounds with degrees of intensity of the same feeling.

By temperance in all things, as eating, drinking, &c., and daily practice in the scales of music or in the several forms of speech-note, defective voices may be considerably improved and preserved. To this end the great objects to accomplish are—1. To improve the quality of the voice in clearness and resonance. 2. To make every note in its compass equally pure. 3. To extend its compass both above and below. 4. To obtain power to produce a prolonged note on each degree of its compass.

VOITURE, VINCENT, was born at Amiens in 1598. His father was a wine merchant, but an attendant upon the court, and known to all the principal people there. Voiture himself was educated at Paris. Two poems by him, one in Latin and the other in French, on the assassination of Henry IV., were published in a collection of pieces by members of the college of Calvi, in 1612; the same year appeared his 'Hymnus Virginis, seu Astreæ;' and it was at the college de Boncour that he made the acquaintance of M. d'Avaux, who afterwards, when he became superintendent of the finances, gave his friend the valuable place of one of his first clerks. He soon became distinguished at court; and he spent the rest of his life in the society of the great, occasionally visiting foreign countries on some court mission. Among the places he enjoyed were those of maître d'hôtel to the king, and introducteur des ambassadeurs to the duke of Orléans. He was elected a member of the French Academy in 1634, and of that of the Umoristi at Rome in 1638. He died in 1648.

With the exception of his early pieces, and some stanzas addressed to Gaston of Orleans in 1614, Voiture printed nothing in his lifetime; but his French writings were collected after his death, and published at Paris in 1650; and they have since been often reprinted. They consist of letters, poems, and a portion of a prose romance entitled 'L'Histoire d'Acidalis et de Zelide.' His Latin verses were first added in an edition of his works published at Paris, in 2 vols. 12mo, in 1729. He is also said to have written easily and correctly in the Italian language, as well as in French and Spanish. There are at least two English translations of Voiture's 'Letters,' which appeared in 1657 and 1736.

VOLCANO (Lat. *Vulcanus*, the god of fire, a name closely allied to the Sanscrit *ulkâ*, 'a firebrand') is a portion of the earth's surface, whence mud, steam, ashes, scoria, and melted rocks, or lava, are violently ejected through a hollow depression or *crater* (from *cratera*, 'a cup') in a conical hill or mountain. This hill or mountain is in most cases composed of the erupted material, which has accumulated round the point of eruption, or at all events has, in course of time, added to an already existing elevation its conical summit.

Volcanic phenomena are closely connected with earthquakes, and the regions most troubled by the latter are also the principal seat of the former. Hence their occurrence on a formidable scale is generally limited to the tropical world. But no law of this kind can be laid down, since Sir James Ross discovered two [v]canoes, Mount Erebus and Mount Terror, [in] wastes of the Antarctic circle; and now[here] igneous agency more powerful than in frozen the peninsula of Alashka, the north-eastern of Kamtchatka.

Volcanic districts are therefore of very c[on]siderable extent. And though the points of eruptio[n] great earthquake movements only occur in certa[in] where the volcanic vents are distributed at [the] lesser intervals, and usually in a linear dire[ction] the continuous action of these powers may [be] throughout the intervening area by occasional [ex]sions of the ground, the evolvement of sulphu[rous] and vapours, and the breaking out of therm[al] whose waters are frequently charged with [the] mineral matters as those ejected by a volcanic [vent]. The volcanic fires exist, as abundant evidence [of] strates, beneath the bed of ocean, and are co[n]cerned the elevation and subsidence of islands and li[ttoral] ritories. At many points they may not yet [be] impelled into formidable action, but are destine[d] future time to effect, perhaps, considerable ch[anges] the terrestrial configuration.

Volcanoes are divided into two classes, ac[tive] *extinct*. It does not follow that an extinct vol[cano] for ever remain inactive. On the contrary, [there] instances of renewed eruptions taking place in [vol]canoes supposed to have been extinct for centuries substances ejected are chiefly fused earthy and [stony] bodies, with showers of stones, cinders, ashes, various gases, boiling water, and redhot and melte[d] From nearly all volcanoes the eruptions are nearly tical, though they differ considerably in quantity duration. The quantity is often enormous, and aggregate of volcanic eruptions must have exer[ted] powerful modifying influence on the surface of our [g]

Of the connection between earthquakes and vo[l]canoes no doubt can be entertained. All great eruption[s] commonly preceded by violent oscillations of the which have ceased on the bursting forth of the v[o]lcanic fires, as if the bosom of the globe, charged with p[ent] stuff, had been relieved by finding a vent for it.

One of the principal matters ejected from ac[tive] canoes is well known under the name of lava. [It] first a black semi-fluid mass, about as thick as which hisses and seethes on its downward cour[se] externally cooled and solidified by contact with The interior, however, preserves its heat and flui[dity] after the surface has become a cold hard crust.

Nowhere are the volcanic fires more formidab[le] than in the islands of the Pacific, where they traced in very definite zones or belts. Take, for the zone beginning with the Banda group, and [pro]through the Sunda group of Timor, Sumb[awa] Java, and Sumatra, forming altogether a gent[le] line 2000 miles in length; though as the vo[l]is continued through Barren island and Nar[cond]the Bay of Bengal, northward through the isl[ands] fringe the coast of Arracan, its entire length a deal more. It is said that during the last 12 the islands and rocks for 100 miles along th[e] coast have been gradually rising; a result evi[dently] to igneous agency.

The little island of Gonung-Api, one of t[he] group, possesses a volcano of formidable act such is the elevating pressure of the subma[rine] that part of ocean, that a mass of black basal up, of such dimensions as to fill a bay 60 fat

and yet so quietly that the inhabitants were ignorant of the event until all was over.

No spot of the same dimensions on the face of the earth is so studded with volcanoes as Java. The central crest of the island consists of a volcanic range, from 5000 to 13,000 feet high, which terminates eastward in a series of thirty-eight separate volcanoes with broad bases, rising gradually into cones. 'They all stand on a plain but little elevated above the sea, and each individual mountain seems to have been formed independently of the rest. Most of them are of great antiquity, and covered with thick vegetation. Some are extinct, or only emit smoke; from others sulphureous vapours issue with prodigious violence; one has a large crater filled with boiling water; and a few have had fierce eruptions of late years. The island is covered with volcanic spurs from the main ridge, united by cross chains, together with other chains of less magnitude, but no less fury.'

In Sumbawa, which lies close to Java, the volcanic mountain of Tomboro has long possessed an evil reputation. An eruption in 1815 continued from the 5th of April till the close of July. Its explosions were heard in Sumatra, or upwards of 900 nautical miles distant. The shores 40 miles distant were covered with the ejected ashes and cinders. In Java, at a distance of 300 miles, the darkness at noonday was like that of a deep night, the air being filled with falling matter. The stones which fell varied in size from a walnut up to a gourd; and the sea, rising 12 feet above its usual levels, swept away everything within its reach, and submerged the town of Tomboro, with thousands of its inhabitants.

In Sumatra there are four volcanoes; three on the southern, and one on the northern side of the island.

Another volcanic zone or belt begins to the north of New Guinea, and extends through New Britain, New Ireland, Solomon Islands, and the New Hebrides.

The third and greatest of all the insular volcanic zones includes Gilolo, one of the Moluccas, which actually bristles with volcanic cones; and from thence it may be traced to the north through the Philippine islands and Formosa; diverging thence to the north-east, it strikes through Loo Choo to the Japan archipelago, and through the Kurile islands is continued to the peninsula of Kamtchatka, where several volcanoes occur of considerable elevation.

Here a new line of activity begins in the Aleutian islands, which, incessantly beaten by the surge of a stormy ocean, are besprinkled with twenty-four volcanic cones; it sweeps in a bold curve round Behring's Sea till it joins the volcanic peninsula of the new United States territory of Alashka.

Carrying our survey to the other side of the Pacific we find the entire chain of the Andes, and the adjacent islands of Juan Fernandez and the Galipagos, distinguished as a vast volcanic area, which is actually rising at the present hour. Beneath the sea the mysterious communication apparently flashes, and excites to formidable activity the volcano of Owhyhee (Hawaii). This island forms an irregular triangle, its sides measuring respectively 100 miles, 88 miles, and 76 miles. Its entire area (upwards of 4000 square miles) is composed of lava. It contains three lofty volcanic summits, Mauna Loa (13,760 feet) being the principal, and the others being about 14,000 feet and 10,000 feet above the sea-level. On the flanks of Manna Loa is the grand crater of Kilawea, remarkable as the largest in the globe, and as not surrounded by a cone of erupted matter. Within a deep sunken pit, 8 miles in circuit, covered with masses of solidified lava, and black and gloomy as the realms of Erebus, lies the crater itself, measuring 16,000 feet in length and 7500 feet in breadth. In one part a gullet or ravine seethes with boiling lava, of remarkable fluidity, which sometimes swells like boiling water to a great height, and fills the whole area of the crater to the height of many hundred feet with a black, bubbling, hissing, and noisome mass. It seldom rises, however, to the summit of the crater, but finds a vent in the mountain side. Many formidable eruptions have taken place from this volcano within the present century; those of 1823, 1832, 1840, and 1855 being the chief.

The chain of the Andes, to which we have already referred, furnishes a splendid example of linear volcanoes. Some are active, as Cotopaxi (18,775 feet) and Pichincha (19,535 feet), but the greater number are extinct. Cotopaxi and Tungaragua have only been active once in 100 years.

A remarkable volcanic district in Mexico, after remaining undisturbed for 250 years, broke out into activity in 1759. A kind of fissure, or crevice, stretches from the Gulf of Mexico to the Pacific, in a line about 16 miles north of the city of Mexico. Along this parallel occurs a singular series of active volcanoes; Tuxtla, the most eastern, is in the 95th degree of west longitude; more to the west rises the snow-shrouded cone of Orizaba, with its ever-fiery crater, seen like a star in the depth of the night, which has obtained it the name of Citalapetl, or the 'Mountain of the Star.' Popocatepetl, the loftiest mountain in Mexico, 17,884 feet above the sea, lies still farther west, and is in a state of constant eruption, which, with the peaks of Iztacihuatl and Toluca, form a species of volcanic amphitheatre in whose bosom lies the city and lake of Mexico. These three great cones are united by a chain of smaller volcanoes. On a plain to the south-west, about 70 miles in a straight line from the Pacific, occurs the volcano of Jorullo. It appeared suddenly, and rose 1683 feet above the plain on the night of the 29th of September, 1759, and is the highest of six volcanic cones which have been thrown up since the middle of last century. The eruption, which had been preceded by alarming noises and earthquakes, did not cease till 1760. Another eruption took place in 1819, when ashes fell in Guanaxuato, at a distance of 140 miles, in such quantity as to lie 6 inches deep in the streets.

Few centres of volcanic action now exist in the great continent, though the Mediterranean is still 'undermined with fire,' which finds occasional vent in the historically famous mountain of Vesuvius and the magnificent cone of Etna.

The eruptions of Vesuvius have always been of a terrific character. Yet from the remotest periods of antiquity down to the Christian era, this volcano was inactive, and its active career did not begin until A.D. 63, when the neighbourhood was convulsed by an earthquake. In August, A.D. 79, occurred the appalling catastrophe which has become historically celebrated. It then ejected masses of mud and lava, and showers of ashes and stones, to the total destruction of the two towns of Herculaneum and Pompeii. These, however, owed their ruin, not to lava floods as commonly supposed, but to an accumulation of mud and ashes. The story is so well known that it is unnecessary here to repeat its details.

Numerous disastrous eruptions have since occurred. In 1631 the town of Torre del Greco, with 4000 persons, and a great part of the surrounding country, perished. The eruption of November 24, 1759, was

land and its Sagas; Lord Dufferin's *Letters from High Latitudes*, &c. See also Humboldt's *Personal Narrative*, and, above all, his *Kosmos*.)

VOLGA, THE, is the longest, and, with the exception of the Danube, has the largest volume of water of any river in Europe; its entire course, which, in consequence of its various windings, exceeds 2200 miles in length, lies within the Russian empire. The direct distance from its source to its mouth is less than 1000 miles. The area of its basin has been estimated at 640,000 square miles, or more than twice that of the Danube, and eight times as much as that of the Rhine. It rises in the Valdai hills, 550 feet above the sea, near 57° N. lat., 33° E. long., on the frontier of the governments of Twer and Novgorod, in a small lake formed by several springs, and it flows through the lakes of Oselok, Plara, and Volga, which it quits about 90 miles above Twer. Near Ostuschkof it receives the Selicharowka, issuing from Lake Seeliger, and attains the breadth of 150 feet; at Rshew-Vladimirow it becomes navigable for small boats, and at Twer, where it is 700 feet broad, for large barges. Having traversed the government of Twer in an easterly direction, it turns N.E. to Yaroslaw, then S.E. to Kostroma and Nijni-Novgorod, where it receives the Oka; thence to Casan, where, having been joined by the Kama, it becomes 1000 yards broad, turns nearly S., and having passed Simbirsk, Saratow, and Astrakhan, divides into eight branches, which inclose seventy islands, and discharges itself by sixty-five mouths into the Caspian Sea, to which it is computed to bring 1,000,000,000 cubic feet of water in an hour. The rivers which join it, with the exception of the Oka, before it reaches Casan, are of no great magnitude; but the Kama, which flows into it at that place, after a course of 1000 miles, makes a vast accession to its waters. By a judicious system of canals, connecting the Düna with the Kama and the Volga, the Polar Sea communicates with the Caspian by a navigation of 4000 miles. The Volga is also connected by canals with the Black Sea, the Lake of Ladoga, the Neva, and the Baltic. Its banks are generally low, but extremely fertile; and there is no other part of Russia where so much oak timber grows as in the vicinity of this river. The navigation of the Volga is much obstructed, in the dry season of the year, by shallows and islands, and the volume of its waters is gradually but certainly diminishing; in May and June, however, the melting of the snow swells them, and often causes extensive inundations. At this season its depth is so increased that large ships descend it in safety from Twer to Astrakhan. Below the latter port the river is very shallow, in consequence of the number of mouths into which it divides itself before entering the Caspian Sea. In winter it is frozen to a great depth; the navigation being open only about 200 days in the year. The Volga abounds more in fish than perhaps any other river in the world, many thousands of small vessels being employed in catching them. Those taken in the largest quantities are sturgeon, carp, and pike of extraordinary size. Seals also come from the Caspian into the mouths of the Volga, where they are captured.

VOLHYNIA (*Wolynsk*), a government of West Russia, formerly included in Poland, lies between 49° 40′ and 52° N. lat., 23° 40′ and 29° 24′ E. long., and is bounded N. by Grodno and Minsk, E. by Kiew, S. by Podolia, and W. by Galizia and Poland. Its area is 27,484 square miles, and the population in 1866 was 1,577,000, mostly of the Greek United Church.

The surface generally presents an inclined plane sloping from S. to N., with a few undulations, none of w however, more than 300 feet above the sea. T and south-western districts are traversed by lo connected by a table-land, about 1000 feet h the Carpathian mountains. With the excep small portion along the north-western bounda is drained by the Bug, a feeder of the Vistula, t government belongs to the basin of the Pripe the largest tributaries of the Dnieper, which r Vladimir, flows N.N.E. into the great marshes whence it runs first E., then S.E., through th ments of Minsk and Kiew into the Dnieper on bank. The principal feeders of the Pripet on in this province are—the Stokhod, the Styr, t (which receives on its right bank the large river the Oubort, and the Ouj. The Teterev, a dir of the Dnieper, drains the south-eastern distric Bog rises just within the southern boundary. northern frontier there are extensive peat m morasses; and where there are hills, wheth north or south, they are clothed with forests oak, beech, and lime. There are several minera The climate resembles that of southern Germ the winter is rather more severe, and the r frozen every year. There are no prevalent except the PLICA POLONICA. The cattle are fine kind, but a murrain often prevails among t has thus nearly destroyed what was once a industry. Sheep and horses of a good breed ar

Volhynia is one of the most fertile provinces c The rich crops of grain are, however, to be attr the soil rather than to the farming, which is c and slovenly. In the northern border the pas so luxuriant as almost to hide the sheep and g feed in them. In the south, besides rye, barley kinds, oats, and millet, the farmers cultivat species of wheat of the finest quality, and hav annual surplus for exportation, which is sent t Galizia, Poland, and Great Russia. Flax ar rapeseed, tobacco, and pulse, are also grown abundance: linseed, hempseed, and oil are In some parts mustard, saffron, and capsicum a and hops and common fruits are generally c Locusts occasionally desolate extensive tracts quantities of timber and fire-wood are convey Dnieper and Bug, partly by rafts, partly by land the forests also furnish much pitch, tar, char potash. The wild animals are stags, elks, fal wild boars, polecats, beavers, otters; a few bears and wild cats; and many wolves and foxes. is a favourite pastime. Great numbers of bees whose honey is celebrated for its good qualit iron, saltpetre, building and mill stone, potter's celain clay, flint, and limestone, are found.

Manufactures are greatly on the increase; t cipal industrial products are sugar, spirits, gl potash, linen, leather, woollen cloths, hosiery, e ware, porcelain, and paper. The surplus agri and industrial produce is chiefly sent down the Live stock, hides, honey, and wax, find a ready in Austria and Poland, whither they are convey Jews, who have nearly the whole trade of the p in their hands.

Jitomir, *Schitomir*, or *Zitomierz*, the capital government, situated on the Terterev, has a tion of about 33,000, who carry on a cons trade in woollen cloths, linen, silks, calicoes, wax, honey, and wine. There are some iron an works and extensive cloth factories. The to

in the tenth century, and was at one time a ongbold against the Cossacks. *Berdykziew*, ill-built place, 25 miles S. from Jitomir, is the nd most commercial town in the country; it al churches, a large fortified Carmelite convent, pulation of 59,000, of whom a great proportion s. There are four very large annual fairs, at ttle, corn, wine, honey, leather, &c., are sold in antities. *Dubno*, an ill-built town in a very strict on the left bank of the Ikva, a feeder of , is famous for its great fairs, and contains hurches, a castle, a monastery, and about 8700 nts, who trade extensively in cattle, timber, and ural produce. *Zaslau*, or *Iziaslav*, a town on in, with 8000 inhabitants, has five churches, tery, and two synagogues—the population in- many Jews. There are six annual fairs, and a ade in the produce and manufactures of the *Ostrog*, on the Welija, a feeder of the Gorin, an ancient castle, several churches, a large convent and school, and about 9000 inhabit- ho carry on a considerable trade; the annual well attended. The first Slavonic Bible was at Ostrog in 1558. *Kremenetz* (*Krzemieniec*), at the foot of a high mountain, on which there astle, has several churches, a monastery, a ium, and 11,000 inhabitants. Seven annual held in the town, but the trade is not exten- ving to the absence of water communication. ly other towns in the government are *Staro- ntinov* and *Radzilov*.

KAMERIA, a genus of the natural family of aceæ, to which a great number of Asiatic plants en referred by different botanists; but these are ed at present to be strictly species of *Cleroden-* It now contains only a single West Indian species, *leata*, which is one of the most common plants in lands of Jamaica, in a dry gravelly soil, as well ost of the other islands, growing to the height 6 feet.

KON'SKOITE, a mineral found in Siberia, the of chromium, of a green colour, with a conchoidal e; the constituents of which are—silica, green f chromium, peroxide of iron, magnesia, and water.

NEY, CONSTANTIN-FRANCOIS CHASSE- , COMTE DE, was born February 3, 1757, at in Anjou, where his father was an advocate. He ucated at the colleges of Ancenis and Angers. He Paris in his seventeenth year, in order to study , which, however, he exchanged for medicine; and ally, on succeeding to an income which rendered dependent, gave up the thought of following any ion. In 1783 he set out for the East, and on urn to France in 1787 published in 2 vols. 8vo, oyage en Syrie et en Egypte pendant les Années 84, et 85.' He had during his absence devoted onths to the study of the Arabic language. He ected deputy of the Tiers État to the National bly; he was also a member of the Constituent bly, and afterwards of the Convention. Volney enerally with the party of the Girondists, till the himent of the reign of terror in 1793, when he to think that matters had been carried too far, ised to support them. In September, 1791, he ed to the National Assembly his 'Ruines, ou tions sur les Révolutions des Empires;' the work ch he first announced his views as to the ical character of Christianity and other religions. fterwards he retired to Corsica in order to culti- vate a property which he had purchased there; but the insurrection headed by Paoli compelled him to leave the island in the spring of 1793. He was afterwards sent to prison by Robespierre as a royalist, and remained in confinement for about ten months; he regained his liberty on the overthrow of the dictator, and soon afterwards he was appointed professor of history in the newly-established école normale, where for about a year he delighted crowded audiences by his lectures. In 1795 he drew up a series of 'Questions de Statistique à l'Usage des Voyageurs,' which were reprinted in 1813. In that year also he published a tract entitled 'Simplification des Langues Orientales, ou Méthode nouvelle et facile d'apprendre les Langues Arabe, Persane, et Turke, avec des Caractères Européens.' His notions upon this subject were opposed by Langlés, Silvestre de Sacy, and other Orientalists; but he never himself relinquished them. The Asiatic Society at Calcutta in 1798 elected him one of its honorary members.

The école normale was suppressed in 1795, upon which Volney proceeded to the United States of America, but returned to France in the spring of 1798. In 1803 he published, in 2 vols. 8vo, his 'Tableau du Climat et du Sol des États-Unis d'Amérique.' His next work was a 'Rapport fait à l'Académie Celtique sur l'Ouvrage Russe de M le Professeur Pallas, Vocabulaires comparés des Langues de toute la Terre,' which appeared in 1805. In 1808 he published a 'Supplément à l'Hérodote de Larcher.' That and his 'Chronologie d'Hérodote,' which he published the following year, involved him in a controversy with Larcher. Volney was one of the senators who voted in favour of the decree passed April 2, 1814, for the deposition of Bonaparte; and on June 4 he was elevated to the peerage by Louis XVIII. He afterwards published two or three other works on the Asiatic and Hebrew languages. He died April 23, 1820. He had published various tracts of more or less importance, and was an anonymous contributor to the *Moniteur* and the *Revue Encyclopédique*.

VOLOGDA, a government of European Russia, extending from 58° 30′ to 64° 40′ N. lat., and from 38° 20′ to 59° 40′ E. long., is bounded N. by Archangel, E. by the Ural mountains, S. by Viatka, Costroma, and Yaroslaw, W. by Novgorod and Olonetz. The greatest length is 760 miles, and the breadth 380 miles. The area is 150,000 square miles, and the population in 1866 was 961,000.

The surface of this government is an immense plain, which extends eastwards to the Ural mountains, and is traversed by a lateral branch of that chain, which crosses the north-eastern part, and forms the watershed between the Petschora and the Dwina: it contains vast forests, extensive morasses, and some lakes. The soil is very various; presenting clay, marl, much peat, and extensive sandy heaths; but there are large tracts in which the surface is covered with a rich mould. The most fertile part is the south-west. The principal rivers are—the DWINA; the Vaga, which is navigable for small vessels, and joins the Dwina in the government of Archangel; and the Petschora, which rises in the Ural mountains, is from 14 to 20 feet deep, and is navigable throughout the summer. The North Catherine Canal, uniting two rivers, both called Keltma, the one a tributary of the Wytschegda (a feeder of the Dwina), and the other a tributary of the Kama (a feeder of the Volga), and completing the junction between the Frozen Ocean and the Caspian, is in this government.

The most considerable lakes are:—The *Kubenskoe*, which receives the Kubana and twenty other small rivers,

and from which one branch of the Suchona issues; two others called *Piätisorskoi*, which are very deep: Lake *Sandor*, 10 miles long and 3 broad: and Lake *Kondas*. Some of the morasses are 25 to 45 miles in circumference.

The climate is very cold, but salubrious; and varies considerably in different parts of the province. The rivers freeze about the middle of November, and thaw in May. In summer there are many foggy, rainy days, and often night frosts. The autumn is frequently serene and bright. In August the leaves fall from the trees, and the birds of passage take their departure.

Agriculture requires the utmost care, and the ground must be well manured. The bread-stuffs grown are rye, barley, and a few oats. Flax, hemp, some hops, peas, and beans, are cultivated. In the north-east, only cabbages, turnips, and garlic thrive; in the south-west, where the produce is sufficient for home consumption, the gardens produce most of the vegetables common in Russia, and also apples and cherries. The immense forests of pines, oaks, and beeches, constitute an important part of the wealth of the district. The chase of wild fur-bearing animals furnishes many valuable articles both for the inland and foreign trade. Horses, oxen, sheep, goats, and swine are numerous. Fish are scarce.

Iron, copper, freestone, quartz, felspar, whetstones, limestone, granite, marble, flints, and salt, are found. The salt springs are very important.

There are manufactories of woollen cloth, linen, ropes, glass, iron-ware, soap, salt, bricks, and paper; also brandy distilleries, tanneries, and manufactories of candles. Vologda lying between Archangel and Siberia, has a very important trade, which is carried on in summer on the rivers, and in winter by means of sledges. The principal trading towns are Vologda, Totma, and Ustjug, from which furs, tallow, pitch, wooden wares, timber, masts, turpentine, and other raw products, are sent into the governments of Archangel and Tobolsk. The annual fairs are very well attended.

Vologda, the seat of government, and the residence of an archbishop, is situated in 59° 12′ N. lat., 40° 10′ E. long., on the river Vologda, 467 miles E.S.E. of St. Petersburg. It is in a beautiful district extensively occupied with gardens, and consists chiefly of old wooden houses. The public edifices are—two cathedrals, about fifty other churches, a gymnasium, and many buildings and magazines belonging to the crown. The inhabitants, who number 12,670, manufacture woollens, linen, silks, leather, sealing-wax, soap, potash, cordage, ropes, bells, spirits, white-lead, colours, vitriol, and have very extensive tanneries and candle manufactories; they likewise make very superior articles in gold, silver, enamel, and lacquered ware. The merchants trade with St. Petersburg and Archangel, to which they send hemp, tallow, Russia leather, linen, candles, linseed, bristles, salted and frozen fish, &c. This commerce is greatly facilitated by the river Dwina, which connects the city with the White Sea. *Totma*, on the Suchona, 110 miles N.E. of Vologda, has many churches and convents, several magazines, and nearly 3000 inhabitants, many of whom are employed in the extensive salt works near the town. USTJUG-VELIKI has been already described.

VOLTA, ALESSANDRO, was born in 1745, of a noble family, at Como, and educated in that city; in 1774 he was appointed professor of natural philosophy in the University of Pavia, and while he held that chair he made the discoveries which have immortalized his name. In 1777 he visited Switzerland, and in subsequent years most of the countries of Europe. In 1804 he was allowed to resign his professorship; and, giving up his studies, he spent the rest of his life at his nat where he was seized with a fever, which, after of only two days, terminated fatally March 5,

In 1775, while pursuing some experiment non-conducting property of wood when imp with oil, he was led to the construction of his phorus,' an instrument which beautifully illustr of the laws of electricity; and during these inve he was further led to the invention of his Condenser. In 1777 he invented the elegant which is called the Hydrogen Lamp. About the s he discovered a process for determining the pr between the two gases, oxygen and nitroge constitute atmospheric air; and he also inve instrument which has been called the Electric

But his name is chiefly distinguished by his ment of electricity in metallic bodies. Under is explained the electrical action in the nerve mals; but Volta was the first to show that the of excitation existed in the metals, and not in t of the animal. He wrote two papers, in communicated his views and experiments to t Society. Further experiments culminated in t tion of what is designated an *Electrical Bat* apparatus which has since, under its various tions, produced such important results. By th of skilfully combining experiments, and a sagacity in perceiving the consequences whic be deduced from them, Volta was enabled many important discoveries; but it is remark he often held unfounded opinions upon the cau phenomena, and he does not appear to have any of his researches so far as to arrive at math precision in his deductions.

A collection of his works, dedicated to Ferdin grand-duke of Tuscany, was published, in Florence, under the title, 'Collezione delle Op

VOLTAIC BATTERY, the apparatus for producing a voltaic current of electricity. sists of two conductors, or metal plates immer liquid which exerts a chemical affinity upon one more than upon the other. Zinc is generally e for one of the conducting plates; and the amount of electricity is produced when the metal is neutral, and not acted upon chemicall liquid employed. The effect of this chemical to produce *electric tension:* if, therefore, both ducting plates were similarly acted upon by th equal tension would be acquired by each, a would be no tendency towards a transfer of ele but when the liquid exerts a greater chemical for one metal than the other, the difference of of the two will be measured by the difference of action. When *no action* takes place on the plate, the difference of tension is at the ma The *specific power* of a battery—the transfer of city from one place to another—is called the *electr force*. The relative affinities of various subst dilute sulphuric or nitric acid, are given in the table; those furthest separated forming the ma getic battery.

Graphite.
Platinum.
Silver.
Copper.
Iron.
Lead.
Tin.
Zinc.

the two conducting plates of the battery are nected together by any conductor external to uid, the electricity produced remains in the ondition, and will, when a sufficient number of s are employed, exhibit the effects of attraction ulsion upon the leaves of an electroscope, like al electricity. When the plates are united by cting wire, completing the circuit, the opposite s neutralize one another; the effect of the al action instantly restores the tension, which is lly destroyed; a constant transfer or *current* is tablished between the plates or 'poles' of the , and the electricity produced is termed *dynamic* ity, from the Greek word signifying 'force' or .' The chemical action that gives rise to the ent of the electric current, takes place during omposition of the liquid in which the plates are ed. To form an active voltaic arrangement, it efore essential that the liquid employed should able of being decomposed. Water, being a very ect conductor, offers great resistance to the passage electric current, and only small quantities of electricity can be excited when water alone is ed, especially if the conducting plates are at any erable distance apart. The addition of an acid or al salt to the water greatly increases its conduct- wer, augmenting the excitement of the current orresponding degree. The oxidable metal is called *ositive*, or *generating* plate, as it furnishes the y of electricity which passes through the liquid to ss oxidable metal, called the *negative* or *collecting* ; and from thence the current returns by the con- g wire back again to the zinc or generating plate. nd of the battery containing the *generating plate* lled the *negative pole*, from the accumulation of tive electricity, the positive having passed into the l, and to the *collecting plate*, called the *positive* since from that terminal the positive electricity s the battery. When two or more pairs of plates connected together in series, so that the positive l of the first is united by a metallic conductor to egative metal of the second, and so on, the *tension* e battery is increased in *direct* proportion to the ber of pairs. Thus four pairs of plates will have times the tension of one pair, and will generate a ent capable of overcoming four times the resistance. gh the *tension* increases with each additional pair lates, no greater *quantity* of electricity will be pro- d than with one pair, the action of each cell being ly that of urging forward a quantity of electricity, l to that arising from the oxidation of the zinc of first pair. If, on the contrary, all the four zinc or tive plates are joined together, and the four copper ositive plates be similarly connected, forming a le pair of four times the surface, the *quantity* of current will be increased fourfold, but the *tension* remain the same as with a single pair of the inal size.

OLTAIC ELECTRICITY, so called after the name discoverer, Professor Volta, of Pavia, is the current lectricity produced by *chemical* action. The princi- distinction between static, or common electricity, and aic electricity is, that while the first produces its ts by a comparatively small quantity of electricity high state of *tension*, and possessing remarkable active and repellent energies and power to force its through obstructive media, the latter is more inti- ely associated with other bodies, is in *enormous utity* although rarely in a high state of tension, and exhibits its effects while flowing in a continuous stream along conducting bodies. The low degree of tension of the voltaic current renders the insulation of the conducting wire comparatively easy; while static electricity, from its great tension or power of overcoming resistance, will pass the most imperfect conductors.

The original form of Volta's apparatus consisted of a series of silver and zinc, or copper and zinc, plates arranged alternately one above another, with moistened flannel or pasteboard between each of them. A series of thirty or forty such plates, 4 inches in diameter, will produce sufficient current to cause a gold-leaf electroscope to diverge, the zinc end with positive, and the silver end with negative electricity. The addition of a little salt to the water materially increases the *quantity* of electricity set in motion; but as the pile does not in any sensible manner increase the divergence of the gold leaves, its *intensity* remains the same.

VOLTAIC INDUCTION. The influence which a conducting wire, through which a current is flowing, exerts upon other conductors near it, is called *electro-dynamic* or current induction. If two conducting wires are placed near to one another without being in contact, the one connected to the 'poles' or terminals of a voltaic battery, the other to the terminals of a sensitive galvanometer: whenever a current is passed through the former, a current in the *opposite* direction to the battery current will flow through the latter, deflecting the needle of the galvanometer to which it is attached. This current is called the *induced* or *secondary* current, the battery current the *inducing* or *primary* current. The duration of the *induced* current is only momentary, at the instant of making contact, the galvanometer needle falling back at once to zero, and remaining there so long as the inducing current flows continuously through the wire. On breaking battery contact the needle will be again momentarily deflected by an *induced* current, but flowing in the *same* direction as the primary or inducing current from the battery. The action of the induced current is greatest when the wires are parallel, and ceases altogether when they are placed at right angles. If the primary current while flowing is either *increased* or *brought nearer* to the induced wire, the inductive effect is similar to that of *making* battery contact; if, on the contrary, it is *decreased* or *removed further* from the induced wire, the effect is like that of *breaking* battery contact.

A current also exerts an inductive action upon the wire through which it flows, called the *induction of a current* upon itself. At the instant a current commences to flow through the coils of an electro-magnet, a momentary induced current is produced in the wire, flowing in a direction the *reverse* to that of the battery current, and opposing it so as to retard the magnetism of the core. At the moment when contact is broken, the cessation of the battery current induces a second induced current in the wire, but flowing in the *direct* or same direction as the battery current, and therefore prolonging its effects and delaying the demagnetization of the core. These induced currents are called *extra* currents, the *direct* current, that produced by the breaking of contact with the battery, being the most powerful; the *inverse* current exists during the time the magnetism of the iron is *increasing*, the *direct* current while it is *decreasing*.

VOLTAIRE, FRANCOIS MARIE AROUET DE, was born at Châtenay, near Sceaux, on the 20th of February, 1694. The name of Voltaire he adopted in his later life from some patrimonial property. His family name was Arouet, and his father a treasurer of local revenues; his mother, Marguerite Aumart, a noble Poitevin lady. At his birth he was so frail and feeble that his baptism was delayed for some months; but as he grew older he grew stronger, and his constitution possessed an energy and a stamina which survived many trials and carried him safely to a green old age. He was a second son, but his father was rich enough to provide him with a good education, and under the tutors of a Jesuit college he acquired a considerable knowledge of the principal branches of learning, and read, easily if not deeply, the best classical writers. It would seem as if from the outset he lived in an atmosphere of unbelief, and his tutor, commenting upon his latitudinarian views, predicted that he would become the Coryphæus of deism, and a dangerous enemy to orthodox Christianity. One of his father's friends, the Abbé Chateauneuf, was so tainted with the laxity of the age, that he did not hesitate to declare himself a sceptic, and in his conversation he was wont to jest at the rites and doctrines of the Roman church. It would seem that his influence over the young Arouet was great, and the latter entered life an avowed opponent of what was then understood as religion.

His wit and ability secured him a ready welcome from the literary salons of Paris, where he found himself in company with divers so-called philosophers, whose abhorrence of the licentious hypocrisy of the court, and whose hatred of the slavish subservience and worldly greed of the church, drove them into the ranks of atheism. Alarmed at the open scepticism of his son, M. Arouet resolved on removing him from the contagion of Paris, and for this purpose procured him a post in the suite of the marquis de Chateauneuf, ambassador at the Hague. Here the impressionable young wit fell in love, and the attachment being imprudent, he was recalled to Paris.

Even at this early date Arouet had formed the design of two of his most important works, 'La Henriade,' and 'Le Siècle de Louis Quatorze.' Repeated conversations with an old man, who could relate the story of both these great monarchs, inspired him with a desire of immortalizing them. Le Grand Monarque, however, had died in the odour of popular antipathy. The mists of false glory with which he had contrived to surround himself had been blown aside by famine, and distress, and national disgrace, and at the dead lion many a dog barked loudly. One of the numerous satires flung instead of immortelles upon his tomb was attributed to the keen, sceptical, audacious Arouet, and though no proof was adduced, he was committed to the Bastile as a warning to treat royal heads and dust with greater reverence. He availed himself of the seclusion to give a definite form and shape to many of his literary projects.

Having been released through the good offices of the duc d'Orléans, he gave to the world his first tragedy, 'Œdipus,' in 1718. Its success was sufficient to encourage him in the path he had chosen, while a couplet much approved by the people provoked that bitter hatred on the part of the priesthood which pursued him through life, and followed him to the grave. The cause of so dire an animosity was as follows:—

> 'Nos prêtres ne sont pas ce qu'un vain peuple pense;
> Notre credulité fait toute leur science.'

('Our priests are not what the silly multitude think them; all their wisdom lies in our credulity.')

In 1722 Voltaire, as he now began to sig visited Holland, and on his route made the acq of Jean-Jacques Rousseau. There was little s between the two philosophers, except a vag deism and an antipathy to the orthodox marvel not that they soon grew jealous of e the jealousy on Rousseau's part descending malignity, which seized every opportunity out its venom.

In 1724 appeared the first (an imperfect, a be an unauthorized) edition of the 'Henria the title of 'The League.' It was the first which French literature had known, and is the greatest which it has produced. It s sonorous passages of elevated morality. The always correct, and often eloquent. But the are wanting in life and reality; they are th of the poet, and we see the wires which their motions. Nor are there any of those images, those bright outbursts of fancy and ima those pregnant suggestions of truth and beau irresistibly appeal to the universal heart. It w poetic light which never was on land or sea, b lives in the soul of the true poet. It is fatally and judiciously lifeless. Revised by the author, reproduced in London in 1728, and dedicated t Caroline, wife of George II.

A personal quarrel, for which the French law then condition afforded no remedy, carried Volta a second time to the Bastile, and after six m imprisonment, he was ordered to quit Paris. He a refuge in England, where he was cordially re by all its celebrities; where he profoundly studi language and literature, and learned to appr Newton, Shaftesbury, Locke, and Pope, though understand Shakspeare; and where he studied principles of constitutional government with a regret that he could not impart them to his countr

He resided in England about three years, and posed the tragedy of 'Brutus,' besides a trag imitation of Shakspeare's 'Julius Cæsar,' whi good sense prevented him from producing on the It was during his residence in this country completed his system of philosophical deism neither the arguments nor the ridicule of the s the 'Encyclopédie' could shake in his accepta should be remembered that an atheist, in th sense of that word, Voltaire was not, though it be doubted whether the vulgar mind would ev to perceive the distinction, in practice, be open and declared atheism and an elegant de believes in no Saviour and no atonement, the truth of a divine revelation. The le scepticism, at all events, is more intolerable earnest unbelief of a Diderot or a Condorcet. have left his cap and bells at the threshold of t

In Voltaire's times the only arena open to athlete who had the courage to contest estab judices and to controvert opinions recommen their antiquity, was the stage. Here Volta rival worthy of his prowess; and his tragedy composed, it is said, in little more than raised him to the very pinnacle of popular fa success was the more remarkable that he h to despise the recognized canons of criticis asserted the right of genius to make its own followed up his success with several other dra however, possessing less vitality, were receiv favour.

With wonderful versatility he then essayed a new path, and produced his burlesque poem of 'La Pucelle,' in which the heartless wit has made the strange mistake of travestieing one of the most heroic passages in his country's history. Its indecency is now much better known than its humour, and its scepticism than its scathing satire. That it excited a storm of indignation may not be wondered at; even in our own days, if published for the first time, it would be severely handled by the critics. 'Write what you choose,' said an opponent to Voltaire, 'and you will not overthrow the Christian religion.' 'We will see about that,' replied the wit. But Voltaire and his opponent both mistook the organized hypocrisy of a licentious priesthood, the superstition of an ignorant people, and the intolerance of a despotic government, for the Christian religion. That truth which is the life and soul of Christianity, all the fiery shafts of Voltaire failed to injure; but they fell with potent effect upon the shams and illusions which a vicious age presumed to set up in the place, and under the name of, the religion of Christ. The truth is that Voltaire was unable to separate Christianity from despotism, and his light superficial nature never penetrated below the crust to the deeper feelings that lie at the heart of things.

Wearied by a long course of petty persecutions, he now resolved to betake himself to some secure asylum where he might develop his literary projects in tranquillity. He chose for his retreat the sweet village of Cirey, on the borders of Champagne and Lorraine, whither he was accompanied by a lady of literary and philosophical tastes, and some ability, the marquise du Châtelet, who studied Liebnitz and swore by Newton. This connection, however, was by no means one of unmixed happiness; and a scientific woman, deep in mathematics and physics, is perhaps not the best companion for a weary philosopher. Many a tempestuous day and wakeful night, says Carlyle, had he with that too-fascinating shrew. 'Setting aside its whole criminality, which, indeed, went for little there, this literary amour wears but a mixed aspect; short sun-gleams, with long tropical tornadoes; touches of guitar music, soon followed by Lisbon earthquakes. Madame la Marquise was no saint, in any sense; but rather a Socrates' spouse, who would keep patience, and the whole philosophy of gaiety, in constant practice. Like Queen Elizabeth, if she had the talents of a man, she had more than the caprices of a woman.'

The philosopher sought consolation for his domestic troubles in literary pursuits. First he produced a popular explanation of Newton's recent discoveries in optics and astronomy. But here again he was tilting at established prejudices. The system in vogue in France, and accepted by its learned bodies, was that of Descartes, and the French physicists refused to admit any rays of light from across the Channel. Voltaire was, therefore, denied the license needed for the publication of his book. He turned from these thorny ways to the flowery paths of poetry, and regained his lost popularity by his tragedies of 'Alzire,' 'Zulime,' and 'Mahomet.' He also began his 'Essay on Man,' and his admirable history of the Swedish hero, Charles XII.; and commenced collecting materials for his 'Siècle de Louis Quatorze' and his 'Essai sur les Mœurs et l'Esprit des Nations.'

While at Cirey he opened his long and famous correspondence with the prince royal of Prussia, whom history and Mr. Carlyle have since dubbed Frederick the Great. The prince solicited the great writer's opinion on a composition which he had attempted in French.

Voltaire was not insensible to the charm of royal patronage, and thus was inaugurated a pseudo-friendship, often interrupted, but protracted over several years by the one's love of praise and the other's love of ostentation.

At an invitation from Frederick, Voltaire visited him at Potsdam, but the friendship between the two barely survived the ordeal of personal intimacy. It was, however, the occasion of his being selected by the French court to undertake a mission of a confidential character at a later period, and in this he appears to have been tolerably successful. In 1746, through the influence of Madame de Pompadour, he obtained a chair in the French Academy; he was also appointed historiographer of France, and gentleman in ordinary of the king's chamber; the latter a singular post for one who professed to be the ardent opponent of flunkeyism. At Luneville he made the acquaintance of Stanislas of Poland, but about the same time lost his companion and congenial fellow-worker, the marquise du Châtelet, who had previously engaged in an intrigue with a M. de Saint-Lambert, and died in childbed, after a brief illness. Some days afterwards Voltaire returned to Paris, consoling himself by the following characteristic quatrain:—

'L'univers a perdu la sublime Emilie.
Elle aima les plaisirs, les arts, la vérité:
Les dieux, en lui donnant leur âme et leur génie,
N'avaient gardé pour eux que l'immortalité.'

('The world has lost the sublime Emilie, who loved pleasure, and art, and truth. The gods, when endowing her with their soul and their genius, only reserved for themselves their immortality.') We may well suppose that the grief was not very deep which could find expression in these artificial lines, nor was the sublime Emilie worthy of any truer tribute. A shameless courtesan, she did not even retain 'the slightest fig leaf of common decency,' and was no more faithful to her lover than to her husband. How few scruples have these philosophers, who yet cannot content themselves with the commonplaces of Christian morality!

At Paris he resumed his well-beloved labours, and among other works produced his dramas of 'Semiramis,' 'Orestes,' and 'Rome Sauvée.' But persecution again levelled at the daring wit its envenomed darts, and he was glad to flee for an asylum to the court of Frederick at Berlin. Here at first he was warmly welcomed; a pension and an order were bestowed upon him; he corrected the king's bad verses, and amused the royal leisure; and the philosopher and the philosophic king discussed in light and easy chat the mysteries of life, death, and the future, proving, to their own satisfaction, how much better the universe would have been ordered had it been submitted to their control. Yet it was impossible that this unequal friendship should long endure. Despite Voltaire's sceptical levity and virulent persiflage, despite of his incessant attacks upon Christianity, he was capable of generous sympathies. He could pity the oppressed, he could feel for the destitute. He admired liberty, and had even some degree of respect for virtue. Between him and Frederick of Prussia there was in fact an antagonism of character which could not long be repressed. The king grew angry, and the wit retaliated with sarcasms. The only tie between them, that of vanity, was sundered, for each had grievously wounded the other's self-conceit. Voltaire determined upon quitting Prussia, but found it no easy matter. Every obstacle was thrown in his way by the indignant monarch, and at length he was arrested at Frankfort on a frivolous pretext. It was not until after many

trials and much protocoling and correspondence that the philosopher effected his escape from the hands of Le Roi Philosophe!

During his residence in Prussia he completed his finest work, the 'Siècle de Louis Quatorze,' which, though disfigured by his antichristian prejudices, fully deserves the high reputation it has gained. The style is lucid as running water; the chain of events is linked together with admirable skill; and so vigorous is the portraiture that the men of the age seem to act and move before the reader, like 'things of life.'

Perceiving that his return to Paris would be the signal for a fresh outburst on the part of his enemies, Voltaire eventually established himself at Ferney, near Lausanne, placing his household under the control of a widowed niece, Madame Denis. Here he distinguished himself by some generous efforts to save the victims of political and ecclesiastical hatred, such as Admiral Byng and the unfortunate Calas; and by a literary industry which gave to the world many valuable results, as well as many deistical productions which the world might have done better without. The effect upon the minds of his contemporaries was undoubtedly disastrous; he undermined their belief in Christianity, and did not perceive that his substitute, a philosophical deism, could never command the heart and soul of a nation. He threw away the props on which the tottering cripple leant, and offered in their stead—a reed! Not that he and the Encyclopédists were the *causes* of the French Revolution, as is vulgarly asserted; the causes lay deeper, and were of old standing; but he did much to ripen and concentrate their effects. He resembled a quack, called in to prescribe for a patient, who rightly diagnoses that the invalid suffers from a desperate malady which will kill him if not checked, but retires without administering any wholesome remedy. Thus he believed in a Supreme Being; at Ferney he even erected a church 'to God;' unfortunately he did not exhibit this God as a loving and chastening Divinity, with a real government of the universe and a profound sympathy for man, but as a philosophical abstraction, which, unrecognizing humanity, humanity in its turn failed to worship or believe.

Personally, Voltaire was a better man than he appears in his writings; a better, a wiser, and a more consistent. Had he never written a line, remarks Lord Lytton, he would have come down to posterity as a practical philanthropist. 'A village of fifty peasant inhabitants was changed by him into the home of 1200 manufacturers. His character at Ferney is still that of the father of the poor. As a man, he was vain, self-confident, wayward, irascible, kind-hearted, generous, and easily moved. He had nothing of the Mephistopheles. His fault was that he was too human—that is, too weak and too unsteady. We must remember that in opposing religious opinion, he was opposing the opinion of monks and Jesuits; and Fanaticism discontented him with Christianity. Observe the difference with which he speaks of the Protestant faith; with what gravity and respect. Had he been born in England, we doubt if Voltaire had ever attacked Christianity; had he been born two centuries before, we doubt whether his spirit of research, and his daring courage, would not have made him the Reformer of the church and not its Antagonist. It may be the difference of time and place that makes all the difference between a Luther and a Voltaire.'

In estimating the character of Voltaire's genius we must take into account the time when, and the place where, it wrought out his work. A Luther in the France of Louis XV. would have been an anachr
It was not the age, nor the country, for such earne
and enthusiasm, and magnanimity, as that of the
German reformer. Yet when Carlyle calls Volta
grand Persifleur, we think he wrongs the philoso
Ferney. His 'Candide' and his 'Zadig' show t
could cherish strong convictions; his daily life
dence that he had deep feelings, and could act
them. The fact is, he went astray from the beg
He began by confusing Christianity with the mas
shams palmed upon a superficial age for the reali
the persecution to which he was subjected would
to have blinded his eyes to the wide difference b
priestcraft and religion. Looking around he saw
ness everywhere; human life appeared a fantasti
bination of farce and tragedy; chastity and tend
and manly honour had ceased to exist; noble th
and pure feelings were the theme of every wi
ridicule; and being no heroic soul, prepared, if ne
to wear the crown of martyrdom, he did not iss
torrent of fervid indignant eloquence at the vi
society, but from a safe distance poured upon the
vitriol of his caustic satire.

It is difficult to signalize all the shifting lig
his vari-coloured genius. It is easier to say w
was *not*, than what he *was*. As a poet he failed
giously. Not that his tragedies and his epics are
of talent; they are clever, well-ordered, sono
rhymed, and full of admirable sentiment; but
they are not poems. They are not without splen
but the splendour is metallic; nor without move
but the movement is mechanical. Of the eleva
the enthusiasm, the ardent love of nature, the s
belief in God and goodness, the mysterious insig
the human heart, the intense realization of an ev
ing beauty, which make the true poet, Voltair
absolutely destitute. Had he even arrived at a
conception of the nature, and objects, and mean
poetry, so able a man could scarcely have perpe
the 'Henriade' or the 'Pucelle.' Happily, th
wholly and for ever dead; and the shining bits of
which he mistook for jewels, men long ago learn
appreciate at their real no-value!

As a historian he cannot be placed in the front
He lacked that power of picturesque grouping and
reproduction of past men and events which distingu
Macaulay. He was still more deficient in that
perception of character and profundity of thought
spell-bind the student in the immortal pages of Ta
Yet it is impossible to deny to his historical work
possession of considerable merits. To the general r
they are as fascinating as a romance. The stream
be shallow, but it is rapid and transparent. The m
is consummate, the treatment masterly. Surely n
ever had such a faculty for bringing events toget
logical sequence, and condensing a mass of inform
in a few swift bright pages. His 'Charles the Twe
for instance, is a model of that kind of biography
fewest words are given the clearest details; and
men, great wars, great negotiations, are all indicate
the briefest but most sparkling touches. The colo
is not rich, but the drawing is correct; it is the mas
piece of an able engraver, rather than the inspirati
a self-possessed artist. In the art of *popularizing* his
he stands pre-eminent.

Admitting his excellence as a novelist, and that in
'Zadig' and 'Candide' he shows both powers of ob
vation and invention, we have next to consider him
a polemic. Here, if we judge him by his success,

shall not rank him very highly, for in spite of his heavy blows the Christian religion stands uninjured. The Encyclopédists and their school have passed away, but the Bible which they sneered at remains the Book of Books. It is sometimes difficult to believe that he is earnest in his opposition; his very virulence seems occasionally artificial. At all events his opposition was not very formidable. His arguments are so many fireworks, which blaze and splutter and crackle, only to leave a *caput mortuum* behind. It has been well said that in all his polemical works he manifests himself ingenious and adroit, rather than noble or comprehensive; fights for truth or victory, not by patient meditation, but by light sarcasm. His bantering smile is not a whit more formidable than Gibbon's 'solemn sneer.' He is the very Don Quixote of scepticism; tilting at giants which are nought but windmills; attacking not Christianity, but what he supposes to be Christianity. His sword is keen and his blows are heavy, but they do little harm, for they are aimed at air, thin air.

Of the seclusion of Ferney Madame Denis at length grew weary, and induced her uncle to return to Paris, where a complete ovation awaited him. Not that his enemies were fewer or less bitter; Jesuits and Jansenists, courtiers, the tools of a corrupt government, the adulators of a licentious monarch, still continued their loud-mouthed attacks. But his supporters had by this time become Legion; the great body of the nation adored him as the high priest of a new philosophy, which was to insure a golden age of peace, enlightenment, and prosperity. So from Ferney to Paris his journey was a triumph; no conqueror returning from the battle-field where he had saved his country's honour could have received a more splendid welcome. His arrival in the capital created the greatest excitement. His levées were more crowded than the king's; his antechamber was thronged by princes and peers; when he went abroad his carriage was followed by a train of equipages, like the tail of a comet. He went to the theatre (the *Comédie Française*), and at the door the multitude welcomed him with shouts and acclamations. He occupied a box belonging to the gentlemen of the Bedchamber, where he sat on the front seat. A cry arose of 'La Couronne!' and Brizard, the actor, stepping forward, placed a garland on his head, contrasting strangely with his withered visage and eyes shining like carbuncles. 'Ah, Heaven, do you wish, then, to kill me!' he exclaimed, weeping with joy, and modestly resisting the honour. He took the crown in his hand, and presented it to the marquise de Villette, a foster-child of his; she refused it, and the prince de Beauvan, seizing the laurel, replaced it on the great writer's head.

After the play was ended, his bust, which had been brought on the stage, and elevated upon a pedestal, was surrounded by the whole body of actors, with palms and garlands in their hands, and a general flourish of drums and trumpets. As soon as the music ceased, Madame Vestris came forward, and read some adulatory verses in honour of the hero of the evening. They were encored, and the actress recited them again. Then each actor advanced and laid his garland round the bust. A Mademoiselle Fanier, in a fanatical ecstacy, kissed it, and her example was followed by all the others. More music and more cheering, and at length the weary philosopher was allowed to return home.

The excitement proved too much for his enfeebled frame. This characteristically French scene occurred on the 30th of March, 1778, and on the 30th of May he was dead: the immediate cause a spitting of blood to which he had long been subject. Two days previous an attempt was made to reclaim him to the church which he had so consistently opposed and so bitterly satirized. His nephew, M. l'Abbé Mignet, brought to the sick-room the curé of St. Sulpice and the Abbé Gautier, and informed him that they waited. 'Ah, well,' said he, 'give them my compliments and my thanks.' The abbé addressed him in few words, exhorting him to patience. The curé of St. Sulpice then came forward, and raising his voice, inquired if he acknowledged the divinity of Jesus Christ? The dying man pushed away the officious priest with the simple remark, 'Let me die in peace' (*Laissez moi mourir en paix*). He had no time then to live over again his life, to retrace his steps, to regret the past; what was done, was done absolutely and irretrievably, and there could be nothing more but to die in peace.

He expired on the 30th, about a quarter past eleven at night, with the most perfect tranquillity, but after having endured extreme suffering through some drugs which he had imprudently taken. Two minutes before his last breath he took the hand of Morand, his valet-de-chambre, who was watching by him, pressed it, and said, *Adieu, mon cher Morand, je me meurs* ('Adieu, my dear Morand; I am dying'). These were the last words of M. de Voltaire.

We sum up our brief notices of this eminent Frenchman in the words of one well able to take the measure of his genius:—'In life, he was found to be without good claim to the title of philosopher; and now, in literature, and for similar reasons, we find in him the same deficiencies. Here, too, it is not greatness, but the very extreme of expertness that we recognize; not strength, so much as agility; not depth, but superficial extent. That truly surprising ability seems rather the unparalleled combination of many common talents, than the exercise of any finer or higher one: for here, too, the want of earnestness, of intense continuance, is fatal to him. He has the eye of a lynx; sees deeper, at the first glance, than any other man; but no second glance is given. In regard to feeling, it is the same with him: he is in general humane, mildly affectionate, not without touches of nobleness; but light, fitful, discontinuous; "a smart freethinker, all things in an hour." Doubtless an astonishing fertility, quickness, address; an openness also, and universal susceptibility of mind, must have belonged to him. As little can we deny that he manifests an assiduous perseverance, a capability of long-continued exertion, strange in so volatile a man; and consummate skill in husbanding and wisely directing his exertion.'

A good life of Voltaire is still a desideratum in English literature, though Mr. F. Espinasse's biography, of which one volume only has yet appeared (1868), seems likely to supply the void. Mr. Carlyle's discriminative examination of his genius and character will be found in the second volume of his 'Miscellanies.' An interesting sketch occurs in Lord Brougham's 'Philosophers of the Reign of George III.' The reader may also be referred to the 'Vie de Voltaire, par M. le Marquis de Condorcet; suivie de Mémoires de Voltaire, écrits par lui-même;' but more especially to 'Mémoires sur Voltaire et sur ses Ouvrages, par Longchamps et Wagnière, ses Secrétaires,' &c. (Paris, 1826).

The collected edition of his works in French occupies 70 8vo. vols. (Paris, 1820). In English, an edition in 35 vols. appeared in 1761–69; and another edited by Dr. Kenrick, in 15 vols., in 1779–84. Of his separate works the translations are numerous, though very few

are good. The 'Henriade' was rendered into verse by C. L. Jones, 1834; 'La Pucelle,' by W. H. Ireland, 1822. The romances and histories may be obtained in numerous shapes; the latter, particularly those of Charles XII. and Peter the Great, have been eminently popular in England as school-books, for which purpose their elegant and lucid style admirably adapts them.

VOLTAITE, so named in honour of Volta, the eminent Italian physician, is a variety of iron alum, occurring in crystal cubes, of a dull olive-green, brown, or black colour, at the Solfatara, near Naples, and in the Rammelsberg mine, near Goslar, in Hanover.

VOLTAMETER, an instrument employed either as a *comparative standard* of effect, or as a positive measure of the *quantity* of the voltaic current passing through it. It consists of a graduated glass tube, closed at one end, inverted over a glass vessel, so that the open end of the glass tube incloses two platinum foil strips in connection with the 'poles' or terminal plates of the battery. When the apparatus is in use, the tube and vessel are filled with water acidulated with sulphuric acid. If the battery current be then passed through the water, the liquid will be decomposed and the evolved gas collected in the tube; the oxygen is separated at the wire connected with the copper, and the hydrogen at that connected with the zinc pole of the battery. The amount of decomposition, or quantity of gas produced, depends upon the *quantity* of current passing from the battery through the acidulated water in a given time; and as the liquid is decomposed in a quantity exactly proportionate to the quantity of the current which passes through it, the graduated tube becomes an accurate measure of the *quantity* of electricity produced.

VOLTATYPE, or ELECTROTYPE. If the wire connected with the zinc element of a compound battery have a surface of any conducting substance attached to it, moulded into any form, or having any design or pattern cut upon it; while the other wire terminates in a copper plate of equal surface with the former, both being placed near and parallel to each other, but not in contact, and be immersed in a saturated solution of sulphate of copper; this solution will undergo decomposition, and the metallic copper will be slowly and equally deposited on the plate, and will form an exact counterpart or *cast* of the form or pattern. This is *Voltatype*, or *Electrotype*, or *Electro-deposit*.

Let the object to be copied be a small bas-relief of about six inches by four, executed in a material such as marble, ivory, or plaster of Paris. A wax mould is made from the bas-relief; and this wax is converted into a conductor of electricity by being brushed over with powdered plumbago. The mould and a plate of copper are placed parallel, in a convenient vessel containing a solution of sulphate of copper. The copper plate must have a wire soldered to its upper edge, for the purpose of connecting it with that of the battery; and the wax mould must be similarly connected with the zinc element of the battery. The mould and the copper plate being thus placed in the metal and connected by wires, and the solution being poured in, the whole is left undisturbed from twenty-four to thirty-six hours; at the end of which time, the mould, being detached from the battery and withdrawn, will be found covered over with pure bright metallic copper, rough on the outer surface; but when separated from the wax by gently heating, it will, if the operation has been successful, present a perfect copy of the bas-relief, every line of it, to the most delicate markings, having been transferred to the metal with more precision and delicacy than could have been produced by a cast made with the copper in a state of fu

Perhaps few facts connected with the laws of aggre of homogeneous matter are more striking than this scarcely anything indirectly affords a more remark instance of the chemical divisibility of matter.

The copying of coins, medals, seals, and plaster c is extensively practised by this process. The produ of copper busts, made entirely by deposition from tion, is also an example of its application. Stigli the sculptor, devised a mode of coating colossal p statues with copper by the electro-process in the space of two or three hours. Daguerreotype pic are capable of being copied in electrotype, by a ki etching by galvanism; and Mr. Smee has suggeste employment of a plan somewhat similar for etch general.

The terms *Electrotint* and *Glyphography* have applied to two methods of etching by galvanis which the device is produced in rather a peculi The methods are adapted, one for plate-printi which the design is in intaglio; and the other f face printing, as in common typography. Bot been partially brought into use, but not to an siderable extent.

A most curious instance of the extensive appli of the art of voltatype is the fact of calico bein by means of it. The linen, steeped in proper li made to pass between rollers, one of which has formed in it of different metals inserted into i stance, and connected with the zinc of a batter other roller is a simple metallic conductor: the between these surfaces produces different colours difference in their action on the common fluid, a the pattern is imparted to the calico

The voltatype process has been recommend only for copying engravings, but for making the plate itself on which an engraving is to be e The copper-plates prepared for engravers general tain a small portion of other metals, which both the engraving and the etching somewhat unc By the substitution, therefore, of plates produ electro-deposition, in which the copper is quite taminated with other metals, an advantage is pated. To produce these plates, a copper-p prepared in the usual way and suspended in a solution, by which a film of any desired thickne be produced; and by a previous adjustment of th the new portion may be separated from the el form of a distinct plate, susceptible of after prep for the engraver. Or, the copper-plate, instead of made by deposition upon another plate of the material, may be produced on a flat surface of a plaster properly prepared.

The application of this process to gold and silve ing is described in the article ELECTRO-DEPOSIT

Some doubt exists as to its actual inventor, the h as is usual in these cases, being claimed by severa sons. The balance of evidence, however, seems in of Daniell. Jacobi, of St. Petersburg, was the f publish a practical application of the fact in 1839. it was found that Messrs. Spencer & Jordan, each ing independently of the other, had arrived at the conclusion. Messrs. Elkington almost immediately plied the process, and their manufactory still holds the rank in Great Britain. Nor are their wares surp in artistic excellence by any continental firm.

VOLTERRA, a town of Tuscany, built on the s Volaterræ, one of the most ancient of the Etr cities, is situated on a steep mountain, 27 miles

from Leghorn, and has 13,000 inhabitants. On the slopes N. of the town, consisting of tufa-rock covered with a thin coat of earth, are found the numerous sepulchral chambers, called by the Italians 'Ippogei,' to which Volterra owes its remarkable and unique museum of Etruscan cinerary sarcophagi, gold ornaments, gems, weights, bronzes, coins, and objects in terracotta. Some fragments of walls and an arched gateway of Etruscan workmanship are all that now remain of the ancient town. The huge blocks of stone in these structures are uncemented. The Etruscan arch is decorated with three colossal human heads, sculptured on the keystone and the two pilasters. The modern town is walled, and defended by a citadel, partly constructed on the site of the ancient Etruscan walls. Within the inclosure of this citadel is the prison for political offenders, called Il Mastio; the citadel itself has been, since 1818, a House of Correction, where prisoners are made to work at the making of woollen cloths and various other articles. Volterra contains a most interesting cathedral, built about 1254, several churches, a theatre, many palaces, a Monte-di-Pietà, and an antiquated town-hall, finished in 1257. In this building, on the ground floor, is the museum of sarcophagi found in the tombs, and above is placed the public library. The streets are narrow, and except the main thoroughfares, badly paved; the houses are often of great antiquity. The chief business of the inhabitants is the carving of alabaster ware, with which they supply the markets of Florence, Leghorn, and Pisa; besides which, vases, &c., are exported to the United States, India, China, and Russia. There are rich copper mines near Monte Catini, 12 miles distant; and 5 miles to the southward of the town are the salt works of Leopoldo, and brine springs, which furnish the greater part of the salt used in Tuscany. The land immediately surrounding the town produces wine, oil, corn, and mulberry trees.

VOLTI, in Music, a term from the Italian, signifying that the leaf is to be turned over. V.S. means *volti subito*, 'turn quickly.'

VOLTIGEURS, a name given to the picked companies of irregular riflemen attached to the French regiments, and indicative of their great activity. They are usually chosen to head an attack. Voltigeurs were established by Napoleon during his consulate.

VOLTZITE, a mineral of a yellowish-red colour, and pearly lustre, and so called in honour of M. Voltz, a French mining engineer. It is divisible into thin plates, and occurs with a conchoidal fracture; specific gravity, 3·60; hardness = 4·5. Its constituents are—sulphuret of zinc, oxides of zinc and of iron, and organic matter.

VOLUBILIS (Lat. 'rolling'), in Botany, a term applied to stems or leaf stalks, and similar bodies, distinguished by a property of rolling or twisting round some other body.

VOLUME. This word, as meaning a part of a book, is derived from the old form of a book, a roll (of parchment—*volumen*, from *volvo*, 'I roll'). But our language takes from the French a sense of which the Latin knows nothing; and *volume* means bulk, size, or solid content. Thus the volume of a sphere is two-thirds of that of its circumscribed cylinder: the volume of a cone is one-third of that of a cylinder of the same base and altitude, and so on.

VOLUNTARY, in Music, an extempore performance on the organ, intended as a variation or embellishment, during divine service, or more generally at its conclusion. It was originally so called because its performance, or non-performance, was at the option of the organist. Sometimes the Voluntary consists of a written composition, which generally exhibits great freedom of style and manner; but at the same time requires some portion of musical genius to produce the effects intended. This species of music admits of a considerable variety. The change, order, and number of its movements, have never been settled by any law deduced from the authority of particular example or general usage; consequently much is left to the fancy, taste, and judgment of the composer; and if, in the aggregate, he preserve a sufficient degree of dignity, seriousness, and science, not admitting any lighter ideas, or passages, than are calculated to relieve the more solemn, he may be said to keep within the pale and sacred use for which the organ is so truly fitted and designed.

VOLUNTARYISM and VOLUNTARY SYSTEM are words much in use of late years to express the principles of those who are opposed to the state endowment and control of religion, and according to whom the national church system is a failure—the source of very extensive evils and abuses. The inadequacy of the system, it is said, is admitted by very high authorities within the church by their appealing for voluntary subscriptions whenever it is designed to benefit the masses of society, who, if any one, might be expected to reap the advantage of the state connection in having that spiritual care for which they are unable to pay. Further, they allege that religion itself is not benefited by the alliance, for if an individual is compelled to pay for anything, whether he participate in it or not, the only feeling he is likely to cherish towards that object is one of repugnance; and, therefore, a citizen has only this feeling towards a certain form of religion when, to support it, his rent is burdened, his assessment increased, his goods and chattels distrained, or he himself thrust in the common gaol in default of payment—proceedings very difficult to reconcile with scripture or justice. The advocates of voluntaryism base their arguments on the expressed law of Christ and his apostles, and they define civil as well as religious obligations from this law. The support of religion, they say, should be on the apostolic principle, that 'he that is taught in the word' should 'communicate to him that teacheth in all good things;' and the domain of the civil power should be exclusively confined to the secular concerns of individuals and society; its only connection with religion being in the fact that they who make and administer the laws should themselves embrace and profess the Christian religion, do all that appertains to their office consistently with the paramount claims of morality and religion, and employ wisely and justly their influence in protecting all their subjects, of whatever creed, in the enjoyment of full religious liberty. Even in the improbable case of the nation being wholly unanimous on the religious question, they assert this would be no apology for the principle of levying a general and compulsory tax for religious purposes; for voluntary giving, according as it is needful, should be an integral part of an individual's religion. Voluntaryism indicates no special amount which people ought to give; but those who advocate a principle now becoming increasingly popular, viz., systematic beneficence, or the devotion of, at least, a tenth for religious and benevolent purposes, at the same time advocate voluntaryism, and say that if every one thus gave systematically there would no longer be the least need for state assistance in religion or education. Truth, as well as error, should provide for itself. It devolves on those who enjoy the

services of a pastor to contribute to his support, and it is as just that they should do so as that they should pay for temporal light and food; but if a man chooses to abstain from religion there is no more reason in forcing him to support it than in compelling him to pay for goods he never wished to buy. The advocates of voluntaryism have hitherto generally objected to national schools and government grants for education, holding that the children of classes not necessitous should be educated by private means or free enterprise; and the education of the poor should be secured by the same influences which originate and sustain other necessary and benevolent measures; the strong should help the weak, for, as in religion, a mutual and collective responsibility rests with the general membership to supply each other's educational as well as ecclesiastical necessities. On this point of education, however, it is but right to state that a gradual change is working in the mind of many persons who in the matter of religion are strong upholders of the voluntary principle, as they begin to see that nothing but state aid, and possibly state compulsory interference, can meet the case of thousands of the poorer classes. As to national fasts and thanksgivings, voluntaries hold that the royal proclamations appointing them have no right to be couched in the language of command, that of invitation being the most proper—if, indeed, the civil power has any right to appoint such days at all, which is questioned. The advantages of simultaneousness and unity are attainable on the widest scale by the national concert of churches, apart from the royal prerogative, which, if it may be followed when right, need not be waited for as indispensable to true national worship. Voluntaryism regards marriage as a civil transaction, and demands that all religious parties stand on the same level in regard to its solemnization. The word is sometimes used by politicians to signify the religious equality of all citizens in the eye of the law.

VOLUNTEERS. During the last French war, and especially at the time when there seemed every probability of an invasion, a large portion of the available male population of the United Kingdom became volunteers, and held themselves ready to proceed to any place within the kingdom where their services might be required. In 1803 the number of these citizen soldiers was upwards of 450,000. At the conclusion of the war the force was gradually broken up, and nothing more appears to have been thought of the matter till 1859, when some talk of the possibility of another French invasion seemed to have entirely aroused the nation to a sense of its insecurity, and volunteer companies rapidly sprang up all over the country, so that in the following year upwards of 150,000 men were enrolled. At first the government did not give much encouragement to the movement; but when they saw the turn which affairs had taken, they wisely assisted it by combining the companies into battalions, appointing paid adjutants and drill instructors, and a staff of inspectors whose duty it was to visit the different corps and battalions, and keep them as efficient as possible. Acts of Parliament were also passed for the regulation of the force, and in 1863 what is known as the 'Volunteers' Act,' which embodied and amended all previous statutes, and under which the force is now regulated, received the royal assent. The chief provisions of this Act are—

1. *Organization.*—Any persons, not less than seventeen years of age, may offer their services through the lord-lieutenant of their county; and when these are accepted, the proposed corps is to be consi formed. If it consists of sixty members it is to a captain, lieutenant, and ensign, and to an h surgeon and chaplain. Officers are to be comm by the lord-lieutenant of the county, subject approval of her Majesty. They are to rank wi of the regular and militia forces, but as youngest respective grades, and with the officers of the yo corps, according to the grade and the date of the missions. Every officer, on receiving his comm and volunteer on being enrolled, or as soon afte as possible, must take the prescribed oaths. A teer, not on actual military service, may quit hi on giving fourteen days' notice in writing to hi manding officer, delivering up his arms, &c., in order, and paying any money due by him on acco the rules of the corps. Volunteers in actual may be put under a general or field-officer of the who is senior in rank to every volunteer officer th under his command; but they are still to be led b own officers. Every volunteer corps is to be ins annually by a general, or field-officer of the army an order in council may define what is required volunteer may be considered as *efficient*. Und present regulations, for every such volunteer the (not the volunteer himself) receives from the g ment, as a capitation grant, 30*s*. per annum, w the only pecuniary assistance they give to the except the pay of drill sergeants, adjutants, and i tors. It should be stated that, as a rule, a drill se is appointed to every corps, and an adjutant to every six. The latter is generally an old military and receives 10*s*. a day and an allowance for The rifles of the volunteers and a certain annual s of ammunition are also supplied by the govern but the members of the force have to provide the uniform and accoutrements. The former may be colour and pattern, subject to the approval of the lieutenant: the only restriction the government on the matter is that the officers must not trem closely on those of the regular army or navy by w gold lace or buttons.

2. *Military Service.*—If an invasion is appreh the queen may call out the volunteer force; members must then assemble and march, 'within Britain,' as directed by the lieutenant of the cou which their respective corps belong; and all vol refusing to assemble or march are to be consider deserters. When called out, every member of the if he desires it, is to receive two guineas, which, of it, is to be laid out in necessaries, according directions of the commanding officer; each is to r pay and be billeted, &c., as persons of the same p in the army, and to have relief for their wive families, as in the militia. On the release of a from actual service, each member, desirous of it, receive one guinea in addition to his pay. A vo be released only by an order in writing, signed lieutenant of the county, and addressed to the manding officer; and before a corps is so relea must be returned to the county to which it be An officer disabled in actual service is entitled to pay; and if killed, his widow is to receive a p A volunteer disabled in the same way is to h pension, as in the army.

3. *Discipline.*—The commanding officer may any volunteer off the muster-roll for disobedience doing duty with his corps, for neglect of duty o conduct, or any other cause in his opinion suf

but her Majesty may give such directions regarding the case as she may deem fit. Minor offences are punishable by fine or otherwise. Any officer or volunteer engaged in any duty, and wearing his accoutrements, may be put under arrest by the officer commanding the corps or regiment, if he disobeys any lawful order; but he is to be liberated as soon as the exercise, march, &c., is finished. Every general court martial must consist of at least nine members, and every district court martial of at least five. Sentences are not to take effect until confirmed by a principal secretary of state, and authorized by a warrant under the royal sign manual. In actual service, volunteers are subject to the provisions of the Mutiny Act.

4. *Rules, and Property of Corps.*—The members of a corps may make rules regarding their civil affairs; but these are not to take effect until they receive her Majesty's approval. All right in property, power to sue, &c., are to vest in the commanding officer for the time being. If a member of a volunteer corps or regiment refuse to pay money due by the rules of the corps or regiment, it is recoverable, with costs, either under the Act or by the ordinary legal means. A volunteer making away with, or refusing to deliver up, when duly required, anything issued to him, besides being obliged to pay its value, with costs, is liable to a penalty not exceeding 5*l.*; and any person aiding or encouraging a volunteer in the commission of such an act, is liable, for the first time, to a penalty not exceeding 20*l.*, and for every subsequent offence, to a penalty not exceeding 20*l.*, nor less than 5*l.*, with or without imprisonment or hard labour. Any one wilfully damaging the butt or target belonging to a volunteer corps or regiment, is liable to a penalty not exceeding 5*l.*

5. *Exemptions.*—Members of volunteer corps are to be exempt from liability to serve in the militia of England or Scotland, as long as they are on the roll. Horse duty is not to be charged for a horse belonging to any member of a volunteer corps, if used for volunteer purposes on six days which are within the twelve months ending the 5th of April preceding the year of assessment. A person is not to lose any interest in a Friendly Society by being a volunteer, notwithstanding rules of the society to the contrary. The members of a volunteer corps are not to pay any duty or toll at a turnpike, &c., going or returning from any volunteer duty, nor any horse, waggon, &c., used for volunteer purposes; and any person demanding or taking toll, &c., in such case, is liable to a penalty not exceeding 5*l.*

The above Act only applies to Great Britain. In consequence of the bitter state of class and religious feeling in many parts of Ireland, no volunteer force has been allowed to be enrolled there. The number of men in the force in England and Scotland is about 170,000.

Questions having arisen as to the power of the civil authority to call out the volunteer force to act in aid of the civil power in the suppression of riot or public commotion, and doubts having been expressed as to the duty of the members of the volunteer force, if so called upon, in 1867 the War Office issued a circular for the general information of the volunteer force, in accordance with the opinion of the law officers of the crown, but the wording of it is exceedingly vague, and leaves the matter in almost as much doubt as before. It says her Majesty's subjects are bound, in case of the existence of riots, to use all reasonable endeavours, according to the necessity of the occasion, to suppress and quell such riots; and members of the volunteer force are not exempted from this general obligation. The civil authority is not in any case entitled to call upon or order volunteers to act as a military body, with or without arms, in the preservation of the peace; but members of the volunteer force may, in common with all her Majesty's subjects, be called upon and required by the civil authority to act as special constables, for the purpose of suppressing and quelling riots. In cases of riots and disturbances not amounting to insurrection, and not having for their object the commission of felonious acts or the subversion of the civil government, special constables, whether volunteers or others, should not be armed with or use any weapon other than the ordinary constable's staff, and in such cases no volunteer should, when acting as a special constable, appear in his military dress; but in cases of serious and dangerous riots and disturbances, the civil authority may call upon and require her Majesty's subjects generally, including volunteers, to arm themselves with and use such other weapons of defence or attack as may be in their power, but firearms should be the last so used.

According to the estimates for 1868–69, the annual cost of the volunteer force in Great Britain amounts to 385,000*l.*, of which 230,000*l.* is for capitation grants to members. The whole of the remaining 155,000*l.* is—with the exception of about 4000*l.* for miscellaneous charges—required for the adjutants and sergeant instructors; the former having 94,000*l.*, and the latter 58,000*l.*

VOLUTA (Lat. 'a volute'), in Zoology, the term applied by Linné to a certain genus of the *Vermes testacea*, including those which possess a univalve spiral shell, with a tolerably widened and beakless aperture, and a twisted or plaited columella, generally without lips or perforation.

VOLUTE, a rolling or spiral curve, a name particularly given to the spirals which appear in architectural columns, as ornaments of the capitals. In the Corinthian and Composite capitals the volutes are smaller and diagonally placed.

VOLUTIDÆ, a genus of the *Vermes Testacea*, whose shells are prized by collectors above most others for their beauty and rarity; and which, from their numbers and carnivorous habits, are powerful agents in keeping other *Mollusca* and *Conchifera* within due limits.

Lamarck, in his 'Animaux sans Vertèbres,' truly observes that the genus *Voluta* of Linnæus, although characterized in a manner sufficiently distinct by the plaits on the pillar of the shell, is far from natural; for it unites shells of different families, which ought to be separated because they do not approximate at all. It comprises, says Lamarck, in fact, shells with an entire aperture, as the *Auriculæ*, others with an aperture which is canaliculated at the base, as the *Fasciolariæ*, and the *Turbinellæ*, which approach the *Murices*; and others again whose aperture is simply notched at the base, like that of the *Buccina*. This gives a very considerable extent to the genus, injurious to the study of species, and defective in regard to the relationship of the component forms.

Broderip remarks, that if any disciple of Linnæus should be disposed to consider the French naturalist somewhat severe, he should remember that, at the time when Lamarck wrote, the number of recent species of *Volutæ*, strictly Linnæan, had increased from 45 to 288, viz.:—*Voluta*, Lam. 44; *Mitra*, 80; *Marginella*, 22; *Turbinella*, 25; *Columbella*, 18; *Auricula*, 14; *Cancellaria*, 12; *Tornatella*, 6; *Volvaria*, 5; *Oliva*, 62.

Since the appearance of Lamarck's work, the researches of naturalists have brought to light such numbers to

swell the catalogue, that the species of many of these genera had, when Mr. Broderip wrote, increased two-fold and even threefold; and the last sixty years have added greatly to that amount.

The general characteristics of the family *Volutidæ* are—Shell turreted or convolute; aperture notched in front; columella obliquely plaited. No operculum. Animal with a recurved siphon; foot very large, partly hiding the shell; mantle often lobed and reflected over the shell; eyes on the tentacles or near their base. Tongue-ribbon linear; *rachis* toothed; *pleuræ* unarmed.

The genera of this family are—*Voluta*, *Cymba*, *Mitra*, *Volvaria*, and *Marginella*.

VOLVA, in Botany, is the external membranous or fleshy covering which incloses the stipes and pileus of the young state of many of the order *Fungi*.

VOMICA (Lat. *vomo*, 'I spit up'), a cavity in the lungs produced by the softening of deposited tubercle in persons suffering from phthisical complaints.

VOMICINA, or VOMICINE (Lat. *vomo*), a name occasionally given to the alkaloid obtained from the bark and seeds of the *Nux vomica* and *St. Ignatius' bean*. It is generally associated with *strychnine*, and is, perhaps, best known under its older appellation of *Brucia*.

VONDEL, JOOST VON DEN, the great national poet of Holland, was born November 17, 1587, at Cologne, whither his parents had retired from Antwerp, in order to avoid the persecution to which they were exposed from the religious severity and jealousy of the Austrian-Spanish government. As soon, however, as the republic of the United Provinces was established, the family removed to Amsterdam. The education he received from his parents did not extend beyond the ordinary acquirement of reading and writing; for his father was only a tradesman, and he himself afterwards dealt in hosiery. For poetry he is said to have evinced a very early taste. It was not until he had reached about twenty-six years of age that he began to study Latin. Not only was his proficiency in the language rapid, but a decided improvement, both as to style and ideas, it is said, soon began to manifest itself in his compositions. His tragedies, which form so considerable a portion and so important a class of his productions, show him to have possessed far higher genius as a lyric poet than as a dramatist; for they owe their chief attraction to the 'Reien,' or choruses, with which they are interspersed. A selection of them was made by De Vries, who published it in 1820. Among the more celebrated of his dramatic poems are his 'Palamedes,' 'Gijsbrecht von Amstel,' and 'Lucifer.' The first of these, which was a direct allusion to the fate of the grand-pensionary Barneveldt, was not published till 1625. It was prosecuted by those in power as treasonable, and he was sentenced to a fine of 300 guldens. The 'Gijsbrecht,' which was written by him for the opening of the new theatre at Amsterdam, in 1637, is justly considered one of his masterpieces, and is that which is most national in its subject. That, however, which possesses for us as Englishmen almost the charm of nationality is the 'Lucifer,' for it may be considered the precursor of our 'Paradise Lost,' which it anticipated by fourteen years.

To enumerate here all the productions of Vondel would be useless. Late in life he lost his wife, which was a severe blow to him, for it was she who had chiefly attended to the concerns of their business. From that time his circumstances grew worse, and his embarrassments were afterwards so much increased by the conduct of a spendthrift son, that at the age of seventy-two he was glad to obtain a situation with a small salary in a bank at Amsterdam. Even there, however, neither his energy nor his genius deserted him, for it was in this period that he composed, besides several other works, his 'Jephtha,' one of the best of his tragedies. At length, in 1668, he was permitted to retire, retaining his salary as a pension for life. He died on the 5th February, 1679.

VORONETZ, or WORONESCH, a government of European Russia, situated between 48° 35′ and 52° N. lat., 37° 45′ and 43° E. long., is bounded N. by Tambow, E. by Saratov and the country of the Don Cossacks, S.W. by Ekaterinoslav, and W. by Kharkov, Koursk, and Orel. Its extreme length is 285 miles; average breadth, about 150 miles; and the area, 25,000 square miles. The population in 1866 was 975,600.

The face of the country is an undulating plain, traversed by low ridges and chalk hills. In most of the circles, of which the government contains twelve, there are woods; in several, extensive commons; but only a few morasses and bogs. The soil consists partly of rich and partly of sand, which soil is generally covered with a pretty thick layer of vegetable mould that is very fertile. The principal river is the Don, which receives most of the other streams, such as the Voronetz, navigable for large barges; the Sosna, the Ikoretz, the Donetz (which forms the S. boundary), and some others. The climate is temperate, and the air clear and healthy; the rivers freeze in December, and thaw in March.

Voronetz is one of the great corn-growing provinces of the empire; the fertile soil requires little or no manure, it is only suffered to lie fallow one year in five or six. The farmers grow wheat, barley, oats, buckwheat, millet, maize, poppies, lentils, peas, flax, and hemp; but agriculture is in a backward state. Horticulture is carefully attended to; the gardens produce all the kinds of vegetables that are grown in Germany, besides large quantities of melons, which are sent to the Moscow and St. Petersburg markets. Tobacco, hops, cucumbers, onions, cherries, plums, some apples and pears, and a few grapes, are raised. The forests afford fine oak timber and firewood, but they are not very extensive. The rich pastures and commons are favourable to the breeding of cattle, which is a very general occupation of the inhabitants. There are numerous flocks of sheep and herds of swine, and a good breed of horses. The best studs belong to the crown. Bees are very generally kept; and a large quantity of honey is obtained. The minerals are iron, chalk, limestone, freestone, nitre, and saltpetre.

The principal manufactures are coarse woollens and soap; and distilleries are very numerous. A little wine is made. The exports are the natural products of the country—corn, flour, cattle, hides, timber, honey, some coarse cloth, iron wares, saltpetre, fruits, hemp, and wax.

Voronetz, the capital of the government, the residence of the governor and of the bishop of that name, is situated 290 miles S.S.E. of Moscow in 51° 40′ N. lat., 39° 23′ E. long., on the river Voronetz, which falls into the Don 2 miles below the city. It is built on a very steep rock, and consists of three parts, the upper town, the lower town, and the suburbs. The first-named contains the residence of the governor and the public offices, the bishop's palace, two cathedrals, the bazaar, and the town-hall. There are in the city twenty stone churches, some convents, a gymnasium, an ecclesiastical seminary, an arsenal, military orphan asylum, and several schools. The streets are very broad, but not paved. The manufactures are cloth for the army, leather, soap, tallow, and vitriol. There are some breweries and brandy distil-

lories. Here, on a little sandy island, Peter the Great erected building docks, in which he intended to construct ships of war for the Black Sea, but on the acquisition of new territory on the shores of the sea itself, and in better situations for the purpose, the idea was abandoned; and not only the docks, but the palace which he built, have almost entirely disappeared. Since his time, however, Voronetz has become one of the chief commercial towns in south Russia, and its merchants trade with all parts of the empire. The population now exceeds 40,000. *Ostrogolsk*, a small commercial town, 59 miles S. of Voronetz, on the Sosna, has several churches, some large magazines, important horse and cattle fairs, and 7000 inhabitants, who carry on an extensive trade. A German colony, adhering to the Confession of Augsburg, has existed here since 1769. The other towns in the government are *Bogutchar*, *Korotajak*, *Novo-Chopersk*, and *Pavlovsk*.

VORTICEL'LA (Lat. *vortex*, 'a whirlpool,' from *verto*, 'to turn'), a genus of Pedicellate Infusoria, which presents some of the most curious phenomena to be witnessed in the animal kingdom. It belongs to the family of the *Vorticellidæ*, or Wheel-animalcules, which are provided with vibratile organs at their anterior extremities; and their rotatory actions produce little *vortices*, or whirlpools, in their vicinity, by which they attract the particles that constitute their food. Of the genus Vorticella, Mr. Gallas has given an interesting account. He describes each of these little creatures as being placed at the top of a long flexible stalk, the other extremity of which is attached to some object. When in activity and secure from danger, the little Vorticella stretches his stalk to the utmost, whilst its fringe of cilia is constantly drawing into its mouth any luckless animalcule that may come within the influence of the vortex it creates; but at the least alarm the cilia vanish, and the stalk, with the rapidity of lightning, draws itself up into a little spiral coil. But the Vorticella is not wholly condemned to pass a sort of vegetable existence, rooted, as it were, to a single spot by its slender stalk; its Creator has foreseen the probable arrival of a period in its existence when the power of locomotion would become necessary, and this necessity is provided for in a manner calculated to excite our highest admiration. At the lower extremity of the body of the animal, at the point of its junction with the stalk, a new fringe of cilia is developed; and when this is fully formed it quits its stalk, and casts itself freely upon its world of waters. The development of this locomotive fringe of cilia, and the subsequent acquisition of the power of swimming by the Vorticella, generally connected with the propagation of the species, which, in this and some of the allied genera, presents a series of most curious and complicated phenomena.

VOS, MARTIN DE, was born at Antwerp, probably in 1531. His father, Peter de Vos, who was a painter, gave him the first instruction in his art, and he afterwards attended the school of Frans Floris. He next went to Italy, where he studied at Rome, and at Venice with Tintoretto, whose style he adopted, and for whom he painted several landscapes as backgrounds to some of his pictures. He distinguished himself in history and portraiture, and painted many portraits for the house of Medici. After a residence of eight years in Italy he returned to Antwerp, where he was made a member of the Academy. He executed an immense number of works: there are more than 600 prints after his designs. He died in 1603 or 1604.

VOSGES, in German VOGESEN, or WASGAU, a chain of mountains bounding the valley of the Rhine on the west from the neighbourhood of Mühlhausen to that of Mayence. It is partly in France, and partly in the Rhenish province of Bavaria. The Vosges unite on the south-west with the Faucilles, and so with the Côte d'Or, and ultimately with the Cévennes; and on the south they join some offsets of the Jura, not far from Béfort, in the department of Haut-Rhin. Cæsar, the earliest writer who has mentioned the Vosges, which he calls Mons Vosegus, evidently included the Faucilles under this designation, since he places in them the source of the Mosa, or Meuse, which is far westward of the Vosges in the present more limited acceptation of the name. The length of the Vosges is more than 170 miles from the depression through which the Canal du-Rhone-au-Rhin passes between Béfort and Altkirch, to the sharp bend made by the Rhine between Mayence and Bingen. The breadth of the range varies. In the northern part, about Mont Tonnerre, it is nearly 30 miles; but this comprehends the lower slopes as well as the higher parts of the range. West of Strasbourg the breadth is about 20 miles. Between Colmar and Plombières, where a branch extends westward from the principal range, it is nearly 40 miles. Another branch extends in a south-western direction from the southern extremity of the main chain into the department of Haute-Saône.

The loftiest summits of the range are in a tolerably direct line, extending from Mont Tonnerre, in the Rhenish province of Bavaria, to the Ballon d'Alsace, in the department of Haut-Rhin in France; and in a line extending nearly at right angles to the foregoing, from the Ballon d'Alsace towards Plombières. The following are the principal summits:—

Ballon de Lure, 3721 feet; Ballon de Servance, 3970 feet; Ballon d'Alsace, 4688 feet, near the source of Moselle; Ballon de Soultz, or de Guebwiller, 4695 feet; Le Bressoir, 4049 feet, near the source of the Meurthe; Le Champ de Feu, 3537 feet, near Schirmeck; and Mont Tonnerre, 2924 feet. The part of the range which is N. of the valley of the Bruche is sometimes termed Les Basses-Vosges, and is known to the Germans by the name of *Hardt*. The eastern slope of the mountains consists of a succession of steep declivities; the valleys on this side are steeper than those of the west, where a slightly undulated surface gradually descends into the plain of Lorraine.

The part of the range extending between the Bruche and Béfort, and also the spur that extends westwards to Plombières, consists chiefly of granitic rocks, intermingled with others containing organic remains. They ordinarily present rounded summits, which are called by the inhabitants of the district Ballons. The region of the granitic rocks is skirted by ranges of mountains of a character altogether different, of square form and more horizontal outline, and composed of a reddish quartzose sandstone, known as the sandstone of the Vosges. North of Schirmeck this forms the mass of the Vosges, and presents a range of heights of tolerably uniform elevation, but of unequal breadth.

The mountains yield a variety of valuable minerals, the most important of which is rock-salt. Coal is found in various parts. Iron ore is obtained, and a great number of iron works are established in the neighbouring country. Other metallic ores found here are silver, copper, lead, manganese, and arsenic.

The summits of the Vosges are covered with snow during a portion of the year. The greater part of the mountains are wooded to a certain height; their summits are covered with large spaces of green turf, to which, during six months of the year, herds of cows

are led to graze. The herdsmen dwell in huts, and make cheeses like those of Gruyère. The forests are chiefly composed of firs, pines, oaks, and chestnut trees. The variety of vegetation which the mountains present renders them interesting to the botanist; and the scenery in many parts is very picturesque. The rivers Saône, Moselle, Marne, Ill, Sarre, Meurthe, and Aube rise in this range.

VOSGES, a department in the N.E. of France, formed out of South Lorraine, is bounded N. by the departments of Meuse and Meurthe, E. by Bas-Rhin and Haut-Rhin, S. by Haute-Saône, and W. by Haute-Marne. Its mean length from E. to W. is 67 miles, from N. to S. 34 miles. Its area is 2300 square miles, and the population in 1861 was 415,485.

Physical Aspect.—The department is mountainous. The west and north-west portions are called the *Plain*, though the surface is far from level. The Vosges mountains, from which the district takes its name, extend along the eastern boundary; and the Faucilles traverse the south of the department from W. to E., eventually uniting with the branches of the Vosges. The latter present a great variety of picturesque and delightful scenery. The Ballon d'Alsace, one of the highest summits, at the point where the branch which joins the Faucilles diverges from the main chain, is 4688 feet high; Le Bresoir, a neighbouring peak, is 4038 feet; and Le Grand-Donon, farther north, is 3313 feet. The department is rich in iron, copper, silver, and marble; in addition to which coal, lead, granite, porphyry, black freestone, cobalt, millstones, slates, gypsum, kaolin, and fine agates, are found.

Vosges lies on the watershed between the Mediterranean, the German Ocean, and the English Channel. The greatest part of it belongs to the basin of the Rhine, the north-eastern corner being drained by the Bruche, and the central parts by the MOSELLE and its tributaries. The west side is included in the basin of the MEUSE, and is drained by that river and its feeders. The north-western angle is watered by the Ornain, which belongs to the system of the Seine. The southern slope of the Faucilles mountains is included in the basin of the Rhône, and is drained by the SAÔNE and its earliest feeders. Not one of the rivers is navigable within this department. There are several small lakes, especially east of the frontier; and numerous mineral springs, the chief of which are those of Plombières and Bains. Among the hills the climate is cold, and in the plain it is humid.

Soil and Products.—Vosges has an area of 1,470,000 acres, about one-third of which is covered with forests, and scarcely a half is under the plough. The *Plain*, in the W. and N.W., is fertile, producing considerable quantities of wheat, maize, oats, hemp, and excellent flax. Cherries are extensively grown for making kirschwasser. The minor agricultural products comprise barley, rye, buckwheat, millet, hops, potatoes, turnips, gentian, and plums. The grass-lands amount to 180,000 acres, and the heaths and open pastures to about 90,000. The number of horned cattle is large. The dairy is much attended to, and large quantities of cheese (of the kind called *Géromé*) and butter are made. The breed of horned cattle is small, as well as that of horses, which, however, are numerous. There are but few sheep. Pigs, goats, game, and fish are plentiful. The vineyards cover more than 11,000 acres, and the orchards and gardens occupy about the same space. The wine made is indifferent. The produce of the woodlands and forests is one of the most important sources of wealth in the department. More than 300 saw mills, worked by water, are empl in sawing deals and staves, which are floated alon Meurthe and the Moselle, or down the Coney into the S

The manufactures of this department are import the industrial establishments, which are not confin one or two centres, but are considerably dispersed the surface, consist of iron works, paper mills, saw m potteries, tanyards, glass works, oil mills, cotton woollen factories, granite and marble works, &c. I musical instruments, great quantities of shoes, sa potash and other chemical products, kirschwasser, which this district has long been famous, are the articles produced.

Divisions, Chief Towns, &c.—Vosges is divided five arrondissements, which, with their subdivisions population, are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 18
Épinal, . . .	6	126	98,51
Mirecourt, . .	6	142	68,59
Neufchâteau, .	5	132	59,08
Remiremont, .	4	39	73,09
Saint-Dié, . .	9	109	115,93
Total, . . .	30	548	415,48

The capital of the arrondissement of Épinal, and the whole department, is ÉPINAL. *Bains*, 14 mile by W. from the former, is famous for its warm baths, has 2596 inhabitants. The bathing season is from middle of May to the middle of September; and waters vary in temperature from 92° to 122° F *Bruyères*, situated 13 miles E. by N. from Épi among the Vosges mountains, has a population of 27 and some manufactures of cutlery and calico. *Rambe villers*, a well-built town, with a population of 4861, situated on the Mortagne, 16 miles N.E. from Épi and has a public library, manufactures of linen, woll stockings, pottery, and leather, and a considerable tra in hops, corn, hemp, iron, paper, &c. There are hi paper mills and iron works near the town. *Xertigny* 10 miles S. from Épinal, has 3992 inhabitants, a forges and blast furnaces, quarries, and paper mills.

The arrondissement of Mirecourt is named from th chief town, *Mirecourt*, on the Madon, 17 miles N.W from Épinal, which has a communal college, civil a commercial tribunals, a public library of 6000 volum and 5533 inhabitants, who manufacture lace, musica instruments of various kinds, and leather. *Charmes*, town of 3059 inhabitants, who manufacture lace, kirsch wasser, and leather, is situated on the left bank of th Moselle, 7 miles E. from Mirecourt. There is a brid across the river here.

In the arrondissement of Neufchâteau, the chief tow is *Neufchâteau*, which stands in a hilly country, 37 mile N.W. from Épinal, near the confluence of the Mous with the Meuse, and has a civil tribunal, a college, public library of 9000 volumes, and a population 3623. The town is said to occupy the site of Ne magus, mentioned in the 'Itinerary' of Antonin Woollen cloth, cottons, lace, nails, and iron, are its ch manufactures. *La-Marche*, near the source of t Mouzon, has a population of 1832.

In the arrondissement of Remiremont, the chief tow *Remiremont*, is built in a picturesque situation, at t foot of the Faucilles mountains, on the left bank of t Moselle, 17 miles S.E. from Épinal, and has a c

tribunal, a college, and 5668 inhabitants. The houses are mostly low; but the streets are wide, regular, and clean. The most remarkable structures are the parish church, which was formerly an abbey church, and is built in the Italian style; and the hospital. The town possesses a public library of 5000 volumes, two pretty public walks, and important manufactures of cotton cloth and yarn, velvet, painted paper, lace, iron, steel, and leather. There are also hydraulic saw mills, and a considerable commerce is carried on in cheese, linen, hemp, hosiery, skins, timber, deal planks, &c. *Plombières*, famous for its romantic situation at a vale-head among the Faucilles, and for its warm, saline springs and baths, has been already noticed. [PLOMBIÈRES.] *Ramonchamp*, a large village, 11 miles S. from Remiremont, on the left bank of the Moselle, has a population of 1440, and some calico manufactures. *Saulxures* or *Saussure*, situated among the Vosges mountains, near the right bank of the Coline, a feeder of the Moselle, and 9 miles E.S.E. from Remiremont, has 4024 inhabitants.

The arrondissement of St.-Dié takes its name from its chief town, *St.-Dié* (*Sanctum Deodatum*), which is situated on the Meurthe, 25 miles E.N.E. from Épinal, and has a civil tribunal, a college, a public library of 10,000 volumes, a diocesan seminary, and 9554 inhabitants. St.-Dié gives title to a bishop, whose see is the department of Vosges. It is well and regularly built, and surrounded by an old wall. The town was long famous for its abbey, founded in the seventh century, and of which Pope Leo IX. had been among the grand provosts. There are cold mineral springs of iron and sulphur near St.-Dié. Cotton yarn, cotton tissues of various kinds, and potash, are manufactured; in the neighbourhood are iron and copper mines (not worked), marble quarries, paper mills, iron forges, and wire factories. The commerce in the articles indicated, and in corn, flax, hemp, cattle, linen, deals, &c., is considerable. *Fraize*, 8 miles S. from St.-Dié, has a population of 2525. *Gérardmer*, or *Géromé*, a town formed by the union of several hamlets and pretty country houses, built without order, in a valley on the eastern shore of the lake of Gérardmer, which is the source of the Vologne, a feeder of the Meuse, has a population of 5921. The town, which is 14 miles S. from St.-Dié, is traversed by a long street, formed by large irregularly-placed houses, with a handsome church in the centre. There are numerous hydraulic saw mills in this place, and its principal industrial products are cheese, wooden vessels, sabots, turnery, &c. *Raon-l'Étape*, built at the foot of a hill, on the left bank of the Meurthe, 10 miles N.W. of St.-Dié, has 3519 inhabitants, who manufacture calicoes, and trade largely in timber and deal planks. *Senones*, 7 miles N.E. from St.-Dié, has 2503 inhabitants, who manufacture calicoes, cotton yarn, and sewing cotton.

The department forms the see of the bishop of St.-Dié; it is included in the jurisdiction of the Cour Impériale and Academy of Nancy; and is in the fifth Military Division, of which Metz is head-quarters. It returns two deputies to the Corps Legislatif. (*Dictionnaire de la France; Annuaire pour l'An* 1868.)

VOSS, JOHANN HEINRICH, was born on the 20th of February, 1751, at Sommersdorf, near Wahren in Mecklenburg. He received his early education in the little town of Penzlin, whence he was sent to the public school at Neu-Brandenburg. Benevolent friends and relations contributed to the expenses of his instruction, for his father was poor, and the boy showed great talent. In 1772 he went to Gottingen, where, with the assistance of Boie, a man of letters, he obtained free board, and was received by Heyne into the philological seminary. In the critical exercises here carried on he occasionally differed from Heyne, which was the beginning of the ill will between them. In 1775 Voss left the university; in 1777 he married Boie's younger sister, and the year after he was appointed rector of the public school at Ottendorf, in the country of Hadeln. In 1781 he published his German translation of the 'Odyssey,' in hexameter verse, which was received with the unanimous approbation of all competent judges. The marshy district of Ottendorf being detrimental to his health, through the influence of his friend Count Frederick Leopold Stolberg he was invited to the rectorship of the gymnasium of Eutin. In 1793 he published his translation of the 'Iliad' and the 'Odyssey;' the 'Odyssey' being an improvement on the former editions. His German translation of the 'Georgics' of Virgil had appeared in 1789. In 1797 he published his version of the 'Eclogues,' which, like the translation of the 'Georgics,' was accompanied with an excellent commentary. Two years later he published his translation of all the works of Virgil, but without a commentary. His numerous original poems were collected and published in 1802, in 4 vols. 8vo. He died at Heidelberg, in March, 1826.

It would require a volume to do justice to the literary merits of Voss, and to review his numerous works. He was an excellent scholar, most familiar with antiquity, and an admirable translator and commentator. As a German poet he is held in high esteem among his countrymen.

VOSSIUS, GERARD, whose real family name was Voss, Latinized into Vossius, was born in 1577, near Heidelberg. He began his studies at Dordrecht, and after having acquired a considerable knowledge of Latin and Greek, he went in 1595 to the University of Leyden. In 1598 he took his degree in philosophy, and began to devote himself to the study of theology, ecclesiastical history, and Hebrew. About 1600 he became head-master of the public school at Dordrecht. In 1614 he accepted the rectorship of the theological college at Leyden. Some years afterwards he obtained the professorship of eloquence in the university. His publication, in 1618, of a history of the Pelagian controversy, involved him in difficulties and brought on him a charge of heresy. Though he had refused two invitations to come to England, Archbishop Laud procured him a prebend in the church of Canterbury, and he came over in 1629 to be installed. He also received the degree of doctor of laws from the University of Oxford. In 1633 he removed to Amsterdam to hold the chair of history in the newly established gymnasium, and died there in 1649. Vossius was a man of extraordinary learning, and had a powerful memory. His writings, most of which relate to classical antiquity, are very numerous, and some of them necessary to a student. They were collected at Amsterdam, 1695-1701, in 6 vols. folio.

VOTKA. [VIATKA.]

VOW (Lat. *votum*), a solemn pledge to perform some particular action, generally of a religious character. The Jews recognized three kinds of vows—of devotion, of abstinence, and extermination or anathema. The Roman Church divides them into *solemn* (taken in the presence of the church's ministers), and *simple* (or private). Monastic vows are the pledges given by an individual on entering one of the monastic orders. Papal dispensations are required for release from the

following vows—of chastity, of pilgrimage, of a crusade, and of entering into a religious fraternity.

VULCAN (Latin, *Vulcanus;* Greek, *Hephæstus*, Ἥφαιστος), the god of fire. According to Homer, he was the son of Zeus (Jupiter) and Hera (Juno), and was from his birth so weakly and ugly, that his mother, wishing to get rid of him, dropped him from Olympus. But Thetis and Eurÿnome, two marine divinities, received him when he fell, and with them he dwelt concealed for nine years, during which he made various beautiful ornaments for the two goddesses. Though his mother had treated him so ill, on one occasion he took her part against his father, when Zeus seized him by the foot and hurled him from Olympus. He fell for a whole day, and alighted on the island of Lemnos. He afterwards returned to Olympus, where he inhabited a palace built by himself. Here he had his workshop with its anvil and twenty bellows, which worked at his bidding, and he produced the most exquisite specimens of art both for gods and men. His wife is called in the 'Iliad' Charis, but in the 'Odyssey' Aphrodite (Venus), who, however, is faithless to him. His favourite island was Lemnos, but Lipara, Hiera, Imbros, and Mount Ætna in Sicily, are also described as places in which he worked. The name is connected by some writers with the Latin *fulgur*, 'lightning;' by others, with the Sanscrit *ulka*, 'a meteor.'

VULCAN, the latest astronomical discovery, and the last great planet added to our solar system, is surrounded with circumstances of peculiar scientific interest. The eminent French astronomer, M. Leverrier, had come to the conclusion that the apparent irregularities of Mercury's orbit could only be explained on the supposition that some unknown planet interposed between Mercury and the sun. He was so assured of the correctness of his conclusion that he submitted it to the French Academy of Science, by which learned body it was accepted as one of the established facts of philosophy. Meanwhile, an 'obscure village doctor,' M. Lescarbault, of Argères, who beguiled his scanty leisure with astronomical pursuits, was establishing as a *fact* what Leverrier's genius had laid down as a proposition. On the 26th of March, 1859, he observed a small planet crossing the disc of the sun. At first he thought himself deceived, but a second observation convinced him that he could not be mistaken. He accordingly made known his discovery to Leverrier, who hastened to Argères, cross-examined the doctor, and went through his calculations; calculations made with chalk upon a carpenter's board, or jotted down in pencil on scraps of paper intended for wrapping up pills and powders. He satisfied himself that these calculations were correct, and on his return to Paris represented the village doctor's claims to the emperor, who bestowed upon him the order of the Legion of Honour.

The distance of Vulcan from the sun is about half that of Mercury. The time of revolution is nineteen days seventeen hours, which is about four times less than Mercury's period of revolution, and the same difference exists in the diameter of the two planets. But we may rest assured that astronomical research will before long put us in possession of more accurate details relative to this latest-discovered member of our solar system. Volume of Vulcan (the Earth = 1), ·0035; light and heat, 30·32; and distance from the sun, ·19.

VULCANITE, or EBONITE, a mixture of two parts of caoutchouc and one of sulphur, heated to 300° Fahr. for six hours. It is much used for making combs, and other articles.

VULCANIZATION. A new method of treating india rubber, by which its valuable properties are greatly increased and some new ones bestowed upon it. Vulcanized india rubber has been employed with great success as a substitute for the spiral steel springs used for the buffers of railway carriages, to moderate the effects of concussion.

VULGATE. The Vulgate (*Vulgata Versio*, or 'common version') is the name sometimes given by St. Jerome to what he elsewhere calls the *Vetus*, or ancient version, and what Augustinus call the *Vetus Itala*, or Old Italian Version, being the most generally received of those early Latin translations of the Scriptures distinguished by biblical critics as the ante-Hieronymian, all of which are now lost, with the exception of some parts of this *Vetus Itala*, and such fragments of the others as are quoted in the writings of the Fathers. Jerome's first labours as a translator of the Scriptures consisted in a revision and correction of this original Vulgate, which he completed about 390. Before this date, however, he had commenced an entirely new translation from the original Greek and Hebrew; and it is this to which the name of the Vulgate is now given. The earlier Vulgate, as revised by Jerome, has perished, except the Book of Psalms and the Book of Job, and the apocryphal Books of Maccabees, Baruch, Ecclesiasticus, and Wisdom. Since the seventh century, when it was sanctioned by Pope Gregory I., Jerome's new version has been exclusively adopted by the Romish church. The Council of Trent, in the sixteenth century, even conferred upon it an authority superior to that of the original text, by ordaining that the Vulgate alone should be esteemed authentic in the public reading of the Scriptures, in disputations, in teaching, and expounding, and that no one should dare to reject it under any pretext whatever. Accordingly, all the Romish translations of the Bible into the modern languages profess to have been made from the Vulgate.

After the invention of printing the Latin Bible was the first considerable work that was sent to the press; but the earliest editions exhibited a very corrupt text. The first critical editions were those produced at Paris, by Robert Stephens (Etienne), in 1528, 1532, 1534, 1540, 1545, and 1546. Of these the edition of 1540 is accounted the best.

The first revised edition of the Vulgate promulgated by authority in the Romish Church was issued at Rome from the press of the Vatican, in three volumes, folio, in 1590, under the title of 'Biblia Sacra Latina, Vulgatæ editionis, jussu Sixti V. recognita et edita.' This edition, the preparation of which had been begun under Pius IV., is known as the Sixtine Vulgate, or the Bible of Sixtus V., from its having been declared by that pope to be the authentic text; yet it had no sooner been published than it was discovered to be full of misprints and other errors. These were insufficiently corrected by the necessary emendations, printed upon separate strips of paper, being here and there stuck over the original word where the passage had been most grossly disfigured; and ultimately Gregory XIV., who succeeded Sixtus V., ordered it to be suppressed. A new edition, in the same form, was brought out in 1592, under the authority of Gregory's successor, Clement VIII., and this is called the Clementine Vulgate, or more frequently by Roman Catholic writers the corrected Bible of Sixtus V. It is now the authorized edition in the Romish church; the Vulgate as since printed being commonly entitled 'Biblia Sacra Latina, Vulgatæ editionis Sixti V. et Clementis VIII.' Protestant controversialists have

naturally enough, taken advantage of the variations to be found between the Sixtine and Clementine Vulgates, each published and declared to be the only true edition by an authority professing to be infallible.

VULPE'CULA ET ANSER ('the Fox and the Goose'), a constellation of Hevelius, situated immediately above Aquila and Sagitta.

VULTURE. [VULTURIDÆ.]

VULTURIDÆ, a family of diurnal Accipitrine Birds. [RAPTORES.]

It has been matter of dispute whether they are directed to their fetid food (for they seldom prey on living animals) by the eye or by the nasal organ. There can, however, in our opinion, be little doubt that both the senses are made to contribute to the discovery of the carcass. The lofty flight and telescopic eye are well adapted to detect any dying or dead animal, and as the action of one vulture may be, and in all probability is, watched by another, a sort of telegraphic communication as to the position of the object is kept up.

The prince of Musignano, in his 'Conspectus,' divides the *Vulturidæ* into the following sub-families, viz., *Cathartinæ*, *Vulturinæ*, *Gypaëtinæ*, and *Gyphieracinæ*.

The *Vulturidæ* of Dr. Gray form the first family of his first sub-order (*Accipitres diurni*) of his first order (*Accipitres*). The following sub-families and genera are placed by Dr. Gray under this family ('Genera of Birds'):—

Sub-fam. 1, *Gypaëtinæ*.

Genus, *Gypaëtos*.

Sub-fam. 2, *Cathartinæ*.

Genera, *Neophron*, *Cathartes*, *Sarcoramphus*.

Sub-fam. 3, *Vulturinæ*.

Genera, *Gyps*, *Vultur*, *Otogyps*.

Sub-fam. 4, *Racaminæ*.

Genera, *Gyphierax*, *Racama*, *Vultur* (*Gyphierax*) *Angolensis*.

'If we fix,' says Mr. Vigors, in explanation of the classification proposed by Mr. Swainson, 'our attention on the distinguishing characters of the Vultures, and at the same time take into consideration the size and strength and consequent powers of body that separate the Vultures from other groups in ornithology, we may at once determine that the birds in which these characters are most strongly conspicuous will form the typical group of the family. These species, therefore,' he remarks, 'may be selected as forming the *Normal Group* of the *Vulturidæ*, in which the powers of the bill and legs are most apparent, the head and neck most devoid of feathers, and the organs of smell most fully developed.' This group, he observes, 'will be found chiefly to inhabit the torrid regions, and their food to be, almost exclusively, carrion, which they prey upon for the most part in large flocks. On the other hand, the *Aberrant Group* will comprise those birds which exhibit a comparative weakness in the bill and legs, a less extension of the organs of smell, and a smaller portion of the head and neck devoid of plumage; or where, although some degree of the size and strength of the more typical birds is preserved, the greater part of the head and neck is covered with feathers.' This group, Vigors adds, 'may be observed to spread itself over the higher and colder latitudes more extensively than the typical Vultures, and to seek occasionally a living prey, which they frequently pursue either singly or by pairs.'

The Vultures are the great scavengers of nature in hot climates, where putrefaction is most rapid, and most injurious to health; and the disposition of their numbers is regulated by an all-wise Creator according to their usefulness. They are sparingly scattered over the south of Europe: in Egypt they are more numerous; but in tropical America, although the species are fewer, the individuals are much more plentiful. No sooner is an animal dead than its carcass is surrounded by numbers of these birds, who suddenly appear, coming from all quarters, in situations where not one had just before been seen. The nakedness of the head, and frequently of the neck, is most apparent in those whose geographic range is limited to the New World, at the head of which division stand two remarkable species, the celebrated Condor of the Andes, and the *Papa*, or King Vulture, of the Brazilian forests. The first is well known for the loftiness of its flight and its great strength, while the latter is the only species whose colouring is not dark or sombre.

From the filthiness of their food, the *Vulturidæ* emit from the skin and feathers a fetid odour. They gorge themselves to repletion, and become partially torpid, and if molested during this inactivity, disgorge the nauseous contents of their stomach over their luckless assailant.

European Vultures.

Vultur fulvus, the Griffon Vulture. Head and neck clothed with down, a ruff of white feathers round the base of the neck. Length exceeding 4 feet. This is *Le Griffon* of the French; *Weisskōpfiger Geier* of the Germans; *Avoltoio di Color Castagna* of the Italians.

It inhabits the mountainous parts of the north of Europe, Silesia, the Tyrol, Dalmatia (where it is very numerous), Spain (abundant near Gibraltar), the Alps, the Pyrenees, Turkey, the Grecian Archipelago, the north of Persia, the north of Africa.

Its nest is generally formed upon the most elevated and inaccessible rocks, but it often builds on the highest forest trees, and in Sardinia on the loftiest oaks, where the nest of brushwood and roots is more than 3 feet in diameter. The eggs are generally two.

Vultur cinereus, the Ash Vulture. Back of the neck denuded of feathers, sides of the neck furnished with curled feathers. This is the *Vautour Noir* of the French; *Cinereous* or *Ash Vulture* and *Bengal Vulture* of Latham; and *Grauer Geier* of the Germans.

The Ash Vulture is found among the lofty mountains and vast forests of Hungary, the Tyrol, and the Pyrenees; the south of Spain and Italy; accidentally in Dalmatia; more common in Sardinia.

According to Bechstein, it is chiefly seen in the plains in winter, where it attacks not only hares, sheep, and goats, but even deer. The farmers are said to suffer severely from its depredations, for it will frequently pick out the eyes of a sheep; but it is not shy, and suffers the approach of the hunter, who is well paid for shooting the destroyer.

Gypaëtus barbatus. Head and neck clothed; tail graduated; iris orange red, or fiery red. Lower jaw bearded. This is the *Lämmergeier* of the Germans. It is the *Avoltoio barbuto* of the Italians, and *Bearded Vulture* of the English. (See Plate 'Vulture' prefixed to this volume.)

Geographical Distribution.—The highest mountains of Europe, Asia, and Africa, the chain of the Pyrenees, and the Helvetian Alps, Sardinia, Greece, and the Tyrol. In Asia the chain of the Caucasus, the Himalaya mountains, the Siberian and Persian mountains. The most lofty mountains of Central Africa, and towards the borders of the Red Sea, principally in the most inaccessible parts of those mountains, and where there is plenty of the larger sort of game. But it becomes more and

more rare in proportion as man advances upon the uncultivated regions which it loves to haunt. Temminck remarks that it is now one of the rarest birds of Europe, whereas formerly all the high mountains of the Tyrol, Switzerland, and Germany were peopled with the species. It is still common in Sardinia. Temminck adds that he has received individuals from the north of Africa, and a number from the Cape of Good Hope; none differing from the individuals belonging to the European Alps.

Habits, &c.—'Unlike the typical Vultures,' says Gould, 'which are distinguished by their bare necks, indicative of their propensity for feeding on carrion, the Lämmergeier has the neck thickly covered with feathers, resembling those of the true eagles, with which it also accords in its bold and predatory habits, pouncing with violent impetuosity on animals exceeding itself in size; hence the young chamois, the wild goat, the mountain hare, and various species of birds, find in it a formidable and ferocious enemy. Having seized its prey the Lämmergeier devours it upon the spot, the straight form of the talons disabling the bird from carrying it to a distance (except in morsels, to its young). It refuses flesh in a state of putrefaction, unless sharply pressed by hunger; hence nature has limited this species as to numbers: while, on the other hand, to the vultures which are destined to clear the earth from animal matter in a state of decomposition, and thus render the utmost service to man in the countries where they abound, she has given an almost illimitable increase.'

The two white eggs marked with brown blotches are said to be laid on the naked summits of precipitous rocks, which are almost inaccessible.

The only vulture which, as far as we can find, has ever been found in a wild state in Britain, is the *Neophron percnopterus*. Forehead and circumference of the face naked; neck feathered. This is the *Vautour Ourigourap* of Le Vaillant, the *Pharaoh's Hen* of Bruce and others, *Avoltoio aquilino* and *Caporaccajo* of the Italians, and *Maltese Vulture* of Latham.

Geographical Distribution.—Found (very rarely) in the north of Europe, in Switzerland in the neighbourhood of Geneva. Very common in Spain on the Pyrenees, Portugal, Malta, Turkey, and in the Archipelago. Nowhere so abundant as in Africa. Russia as far north as Astracan, Arabia, Persia; the Deccan (Colonel Sykes). M. Temminck states that individuals from the south of Africa are always larger than those of Egypt and Europe, and that it is very common in the Isle of Elba and Tuscany.

Habits, &c.—This vulture does not congregate, except when the all-attractive carcass calls them together, but goes in pairs, the male and female seldom parting company. 'In the districts which this species inhabits,' says Mr. Yarrell, 'every group of the natives has a pair of these vultures attached to it. The birds roost on the trees in the vicinity, or on the fences which bound the inclosures formed for their cattle. They are to a certain degree domiciled and harmless. The people do them no injury: on the contrary, they are glad to see and encourage them, because they clean the premises of all the offal and filth they can find. In default of other food they eat frogs, lizards, and snakes. They make their nests among rocks, and the Hottentots assured M. le Vaillant that they laid three and sometimes four eggs: but this he had no opportunity of verifying. The eggs are white.' The young are assiduously attended and fed by the parents for the first four months. In Cairo these vultures are so much prized for their scavengering services, for no excrement or filth comes amiss to them, that it is a breach of rule to kill them. Colonel Sykes states that in the Deccan they are always found in cantonments and camps. For the most part of the day they continue on the wing, soaring in circles. When on the ground, they walk with a peculiar gait, lifting their legs very high.

Asiatic Vultures.

Vultur Ponticerianus, the Pondicherry Vulture. Head and neck naked, excepting a few short white hairs thereon. Locality, Bengal, India generally, Java and Sumatra.

Vultur Indicus, the Indian Vulture. Locality, Ceylon and Ceylon. Head and neck denuded.

Vultur leuconotus, the Chinese Vulture. Allied to the Indian Vulture. This fine bird is very common, feeding upon dead fish thrown up by the waves on the shore, and on carrion generally.

Vultur monachus, the Arabian Vulture. Locality, Arabia, Northern Africa, Persia, India, and some parts of southern Europe. Head covered with a naked bluish skin. (See Plate 'Vulture,' page this volume.)

African Vultures.

Vultur Kolbii, Kolbe's Vulture. Allied to the Pondicherry Vulture. Locality, Barbary and other parts of Africa; also India and Java; several have been shot in Sardinia.

Vultur auricularis, the Sociable Vulture. Head and neck naked; with folds of lax skin; a gigantic and powerful species, common in South Africa, breeding in the fissures of lofty rocks, and, as Le Vaillant states, gregarious in its habits. It has been observed in Northern Africa, and in Greece.

American Vultures.

An account of the CONDOR and TURKEY-BUZZARD is given under those articles, and we must here confine ourselves to a description of

Sarcoramphus papa, the King Vulture, or King of the Vultures. Skin of the head and neck beautifully coloured.

Habits, &c.—With a highly-developed sense of smelling and a piercing sight, the expanse and strength of the wing of the King Vulture enables it to reach a great height, and there remain, bringing its powers of observation to bear over a wide tract of country. Even under hunger, this vulture is said never to attack living and quadrupeds, however small, while they are active, though, when pressed with hunger from the want of its favourite carrion, it will feed upon snakes and lizards. A plentiful and inviting table is spread for it during the summer in the dried-up lakes reeking with putrid fish which have perished there. Perched on the highest trees, it is most frequently to be seen alone or in pairs; but in Mexico travellers state that they have seen it in large flocks. The story that the other vultures stand patiently by till this, their monarch, has finished his repast, appears to be not without foundation, and may be easily accounted for by the superior strength and courage of this species. The general opinion seems to be that these vultures make their nests in the hollows of trees, and that they lay two eggs.

Geographical Distribution.—Wide. Occasional in Florida, in the United States, which is probably its northern limit. Common in Paraguay, but, according to D'Azara, not going beyond 32° S. lat. Between these limits, especially towards the central parts of America, it appears to be abundant.

s the double office of a consonant and a
ural order of the vowels being *i*, *e*, *a*, *o*, *u*.
i, that is *ee*, and of *u*, that is *oo*, are the
and the attempt to pass with rapidity
these to the others, more particularly to
me, gives an initial breathing which has
of a consonant, in the one case *ee-oo*, or
her, *oo-ee*, or *we*. Accordingly the letters
ır as the representatives, sometimes of a
netimes of a vowel. The English char-
ned by the repetition of a *v*, which itself
ty of the symbol *u*. In Latin the *v* or *u*
probably the power of a *w*, a supposition
s for the use of a common character for
d consonant. The Greek and Hebrew
also a single symbol for this consonant,
d the sixth place, and is called *digamma*
vau or *waf* in the latter. But in the
t the letter went out of use, and is there-
omitted in our grammars of that lan-
h the gap at this point in the alphabetical
numbers still bears evidence to the
on of the letter. Most of the modern
Europe are deficient in a symbol for this
French employ the diphthong *ou* pre-
vel, as in the common particle *oui;* the
er *hu*, as in *huevo*, *hueso*. In this way the
w World often gives testimony as to the
ans who originally settled in the country.
an tribe which has furnished a name to
elonging to the United States now called
the old maps is written Ouisconsin, that
g been first visited by the French. So
dico, the town Chihuahua (pronounced
s us that its name was first written by
d the same may be said in the map of
iver Huallaga; and the numerous towns
with the same syllable, Huancavelica,
anuco, &c. At other times the Spaniards
d the letters *gu*, as may be seen in the
s of Spain Proper, which have prefixed
rd *guad*, denoting 'water.' The ancient
refixed a simple *o* to represent a *w*, as in
e use of *w* as a vowel, so far as our own
ncerned, is confined to the end of sylla-
re is always another vowel prefixed to it,
, show, but in the Welsh language it is
tself, and in the middle of syllables with
a vowel. The map of Wales will furnish
mples, as Pwlheli, Cwmtydr, Bettws,
n written Loughor, &c.

ns have a difficulty in pronouncing the
, especially in Germany, where the people
to appreciate the difference between a *w*
st always substituting the latter sound,
ly approaches to it. London, too, is
r the confusion of the sounds; though this
s not seem to arise from any inability to
er a *w* or a *v*, each being substituted for
a most amusing perversity.

The other interchanges of this letter have been already given under the preceding letters. [See C, G, H, M, O, R, S, and F.]

WACHENDO'RFIA, a genus of plants belonging to the natural order *Hæmodoraceæ*. *W. thyrsifolia*, Tall-flowering Wachendorfia, is a native of the Cape of Good Hope, and thrives well in greenhouses in this country. The flowers are of a fine golden colour. *W. paniculata*, Spreading-panicled Wachendorfia, is also a native of the Cape. From the colour of its root it is often called Red-bulb. *W. hirsuta*, Hairy Wachendorfia, was found at the Cape by Thunberg. It is distinguished from the other species by its narrow leaves covered with long white hairs. The flowers are large and of a bright yellow colour.

WADERS. [GRALLÆ; GRALLATORES.]

WADHAM COLLEGE, Oxford, was founded by Nicholas Wadham, of Merifield, in Somersetshire, in 1612, for a warden, fifteen fellows, fifteen scholars, two chaplains, and two clerks.

One fellowship has been suspended, and a sum in lieu of it is paid, under the provisions of the ordinance of the university commissioners, to the professor of experimental philosophy. The fellowships and scholarships are open, without any preference as to kindred or place of birth, and vacancies are filled up after a competitive examination. Candidates for a fellowship must be members of the Church of England, and have passed all the examinations required by the university for the degree of B.A. The scholarships are open to candidates who have not exceeded their twentieth year, and are tenable for five years.

There are ten exhibitions founded by Dr. Hody; four for the study of Hebrew, and six for that of Greek. The present value of each is 45*l.* per annum. The exhibitioners are examined once in every term by the regius professors of those languages. There are also other small exhibitions given by Bishop Lisle and others; but the greatest benefactor to the college was the Rev. John Wills, D.D., warden, who died in 1806, and left 90*l.* a year for a law exhibition to a fellow; 18*l.* a-year for a law exhibition to a scholar; 90*l.* a year for a medical exhibition to a fellow; and 18*l.* a year for a medical exhibition to a scholar; besides bequests to a fund for the purchase of livings.

The buildings of this college, the most uniform of any in the university, are comprised in an extensive quadrangle, about 130 feet square, of modern Gothic, entered through a gate under a tower. Three sides of this quadrangle contain chambers for the Society and the warden's lodgings, and on the east are the hall and chapel. The library and chapel, extending eastward, form two sides of an inner or garden court.

The college was built upon the site of the ancient house of the Augustine Friars. The Royal Society had its origin in this college, and held its earliest sittings, from 1652 to 1659, in the great room over the gateway.

WADS, in Artillery, are of four kinds: junk wads; gummed wads; papier-maché wads, for closing the fuze holes of common, and the wadding holes, of diaphragm

The possibility of securing gain by betting against belief (for against belief it must be) seems enough, were there no other reason, to show that a wager is not morally right unless the odds really represent the opinion of the better: for to maintain that such a wager is a fair one is also to maintain that it is fair to make others meet risk without sharing it.

It may indeed be asserted that each better has his own book, which he endeavours to make up in such a way as to win in every event; so that the whole is an admitted trial of skill. But this excuse breaks down when it is remembered that it is impossible a society of gamblers can make a set of books which will give a balance of gain to all, without *taking in* a number of persons who do not belong to the society; and the question is whether the words in italics have not two real meanings.

WAGER. (Law.) [GAMING.]

WAGER OF BATTLE. In a writ of right, when the tenant pleaded the general issue, viz., that he had more right to hold than the demandant to recover, he might offer to prove it by the body of his champion; which tender being accepted by the demandant, the champion for the tenant threw down his glove, as a gage or pledge, and was then said to *wage* battle with the champion of the demandant, who by taking up the gage or glove accepted on his part such challenge. A piece of ground was then set out, and the champions were introduced, armed with batons and staves an ell long, and a four-cornered leather target. [TRIAL BY BATTLE.]

When they arrived within the lists, the champion of the tenant took his adversary by the hand, and made oath that the tenements in dispute were not the right of the demandant; and the champion of the demandant, then taking the other by the hand, swore in the same manner that they were; next, an oath against sorcery and enchantment was to be taken by both, in this or a similar form:—'Hear this, ye justices, that I have this day neither ate, drank, nor have upon me neither bones, stones, no grass, nor any enchantment, sorcery, or witchcraft, whereby the law of God may be abased, or the law of the devil exalted. So help me God and his saints.'

The battle was then begun, and the combatants were bound to fight till the stars appeared in the evening; and if the champion of the tenant could defend himself till the stars appeared, the latter was to prevail in his cause, but if victory declared itself for either party, for him was judgment finally given. This victory might arise from the death of either of the champions, or by either of them proving recreant, *i.e.*, yielding and pronouncing the horrible word 'craven,' a term of disgrace and obloquy rather than any definite meaning. The effect of the termination of the battle in either of these modes was, that the vanquished party forfeited his claim, and paid a fine; and the champion, if recreant, was condemned *amittere liberam legem*, *i.e.*, to become infamous, and not to be accounted *liber et legalis homo*, being supposed by the event to be proved forsworn, and not fit to be put upon a jury, or admitted as a witness in any cause.

The form and manner of waging battle upon appeals for murder, or other felony, were much the same as upon a writ of right. The appellee, when accused of felony, pleaded not guilty, threw down his glove, and declared he would defend the same with his body. The appellant took up the glove and replied that he was ready to make good his appeal, body for body; and thereupon the appellee, taking the book in his right hand, and in his left the right hand of his antagonist, swore to this effect, '*Hoc audi, homo, quem per manum teneo*, &c.,' 'Hear this, O man, whom I hold by the hand, who callest thyself John by the name of baptism, that I, who call myself Thomas by the name of baptism, did not feloniously murder thy father, William by name, nor am anywise guilty of the said felony; so help me God and the saints; and this I will defend against thee by my body, as this court shall award.' To which the appellant replied, holding the Bible and his antagonist's hand in the same manner as the other, 'Hear this, O man, whom I hold by the hand, who callest thyself Thomas by the name of baptism, that thou art perjured; and therefore perjured, because that thou feloniously didst murder my father, William by name; so help me God and the saints; and this I will prove against thee by my body, as this court shall award.' The battle was then fought with the same weapons, the same solemnities, and the same oaths against amulets and sorcery, that were used in the civil combat; and if the appellee were so far vanquished as not to be able or willing to fight any longer, he was adjudged to be hanged immediately, and then, as also if he were slain in battle, Providence was deemed to have determined against him, and his blood was attainted. But if he killed the appellant, or could maintain the fight from sun-rising till the stars appeared in the evening, he was acquitted. So also if the appellant became recreant, and pronounced the word craven, he lost his *liberam legem*, and became infamous; and the appellee recovered his damages, and was for ever quit, not only of the appeal, but of all indictments likewise for the same offence. (Blackstone.) This barbarous mode of deciding disputes was never recognized in Scotland.

WAGER-POLICY is a name given to a policy of insurance made by persons having no interest in the event about which they insure. Such insurances, formerly common, were found to be productive of many pernicious practices, and therefore the statute 19 Geo. II. c. 37, was passed, by which it was enacted that no assurances should be made on any ship belonging to his Majesty or any of his subjects, or on any goods, &c., laden on board, 'without further proof of interest than the policy, or by way of gaming or wagering, or without benefit of salvage to the assurer; and that every such assurance shall be null and void to all intents and purposes.' The same principle is now carried out in life insurance; and no person is allowed to insure the life of another unless he can show that he has a legitimate interest in so doing. [GAMING.]

WAGES are the price paid for labour, or for services generally. The general rate of wages depends upon the ratio which the capital applied to the employment of labour bears to the number of labourers. If that ratio be great, the competition of capitalists must raise wages; if small, the competition of labourers among each other for employment must reduce them. Whenever the accumulation of capital is proceeding more rapidly than the increase of population, wages will be on the increase, until some check has been given to the increase of capital, or until the growth of population (which is encouraged by high wages) has altered the relative proportion of capital to labourers, and reduced the rate of wages to that which is barely sufficient to enable the receiver of wages to live and bring up children. Wages, then, depend on the relative rates of increase of capital and population, which is equivalent to saying that they depend upon supply and demand. While the general rate of wages is regulated by these causes, there are various circumstances which, by increasing or decreasing

competition for employment, tend to raise or depress the wages paid to persons engaged in particular occupations. Some of the principal of these are—

1. The agreeableness or disagreeableness of the employments.

2. The easiness and cheapness, or the difficulty and expense of learning them.

3. The constancy or inconstancy of employment in them.

4. The small or great trust that must be reposed in those who carry them on.

5. The probability or improbability of succeeding in them.

Wages are usually calculated in money, and are called high or low according to the money price actually paid; but the condition of the labourer is affected by the price of commodities as well as by the amount of his wages. If the necessaries of life be cheap, low money wages may maintain him in comfort; if they become dearer, higher wages will not improve his condition, but will leave him as he was. There is no direct relation between wages and the price of provisions and the other necessaries of life; for the rate of wages is fixed, as has been stated, by other circumstances than the prices of provisions and other necessaries. Yet it cannot be affirmed generally, that if there is a reduction or an increase in this price, which lasts for some time, it will have no effect on the rate of wages. Such effect may be produced not directly by the price of provisions, but by other circumstances which accompany the alteration in price. Of all the causes which promote the prosperity of the labourer, none are more efficient than cheap food and cheap clothing.

The amount of capital invested in any manufacture depends upon the profit that can be realized. Any circumstance which increases the efficiency of labour will tend to augment the rate of profit, for if labour is made more efficient, more wealth will be produced; hence there will be more to distribute both amongst the employers and employed, and consequently wages and profit may both be augmented. But if the commodities which the labourer chiefly purchases become more expensive, one of two things must occur. In the first place, if his wages are not advanced, the real remuneration of his labour will be diminished; or, secondly, if his employers seek to compensate him by advancing his wages, the rate of profit will evidently decline, and a heavy loss will ultimately fall upon the labourer, because capital, or the wage-fund, will be withdrawn from that particular industry, and embarked in foreign or other investments.

When the causes which regulate the price of labour are understood, the folly and injustice of any legislation to fix the rate of wages are obvious. He who has labour to give will always endeavour to obtain high wages, which the hirer will only give if he be unable to obtain it for less. Each will make the best bargain he can, and in this no law ought to restrain him. Experience has long since put an end to any direct legislation in this country on the rate of wages; but the indirect effect of such laws is still felt.

The only sound mode of raising wages and improving the condition of a people is to promote and encourage the increase of the general wealth of a country, by every means which legislative science points out as best suited to that end; and at the same time to remove obstructions, and give facilities to the moral and intellectual improvement of the working classes. By these means capital will be increasing with the natural growth of the population; while the labourers, with better habits, will be less prone to reckless improvidence, and consequ not so likely to outrun the increase of capital.

The question whether combinations of mast workmen can or cannot permanently lower or raise by lock-outs or strikes is fully discussed in the a Strikes and Lock-outs and Trade Societie

Of the changes and fluctuations in the differen of wages, history records many curious instances. centuries ago the amount of wages paid to artisa labourers was about one-tenth of the sum paid present time. This difference is attributable to th scarcity of money, and its consequent value, when pared with the ordinary necessaries of life and the g cost of materials. There are accounts extant o expenses of the building of Eton College, temp. H VI., in which it is stated that the freemasons rec 3s. a week each; the stonemasons and carpenters, 6d.; and the labourers 4d. a day, for working d only; the artizans being allowed for the religious h days. The prices of articles are also given in th accounts, in which it is stated that ale cost 1½d. gallon; four skins of parchment, 3d.; and glue 1d. pound. The charge for sending a man to London w 2s., which is stated to be at the rate of 8d. per day his necessary expenses, including entertainment for m and horse. The Caen stone which was imported building the chapel, cost from 8s. to 9s. per ton. T ragg stone, which was brought from Boughton, n Maidstone, for the same purpose, cost 1s. per ton at quarry; the transit to London cost 1s. per ton; the further carriage to Eton cost 1s. 4d. more. In the latter end of the second year of the building brick-kiln at Slough was finished. The brickla then first distinctly mentioned in the accounts. T received 6d. per day each, with 2d. more to find Chirche, called the *Warden-layer and Brike-leg* The straw, including carriage, cost 10d. and 1s load. The bricks were principally burnt with thor but some sea-coal was used, which cost 7s. a chal Sand was brought into the college at 1d. a load. M bushels of oyster-shells, at 4d. the bushel, were used the work.

(Upon this and cognate subjects much discussion recently taken place, and the reader should consult treatises on political economy of Mill and Fawcett, the articles in reference to labour, capital, and wa which appeared in the *Fortnightly Review*, at intervals during 1866 and 1867. The law of Scotland on t subject is fully detailed in Sheriff Fraser's *Dom Relations*, new edition, 1867.)

WAGHORN'S OVERLAND ROUTE, the route India, by way of Alexandria and Suez, which was fi laid down by Lieutenant Waghorn, an able and adv turous officer. Desirous of facilitating communicati between England and India, which in his day was al carried on by water, he left Suez on the 19th of Octob 1841, with the Bombay mail made up to the 1st of t month. He reached Alexandria on the 20th, and p ceeded by steamboat to a place 12 miles nearer Lon than Trieste. Thence he traversed Austria, Ba Bavaria, Prussia, and Belgium, and reached London half-past four on the evening of the 31st. Lieute Waghorn died January 8, 1853. His exertions w not without fruit, the journey from London to Bom being now accomplished within the month, vid Al andria and Suez.

WAGRAM, a village of Austria, 11 miles N.E. Vienna, on the left bank of the Rossbach. It is fam for the victory gained there by Napoleon I. over

Austrians, on the 6th July, 1809; which was followed by the Treaty of Schönbrunn.

WAGTAILS. *Motacillinæ*. [SYLVIADÆ.] These well-known and graceful little birds appear to be restricted in their distribution to Europe, Asia, and Africa. The species common in England are the Yellow Wagtail (*Budytes Ray*i, Gould); the Gray Wagtail (*Motacilla sulphurea*, Linn.); the British Pied Wagtail (*Motacilla Yarrellii*, Gould). Several distinct species are continental, and of these some may occasionally visit our coast, as the White Wagtail (*Motacilla alba*), which has been confounded with the *M. Yarrellii*.

The following account of the habits of the British Pied Wagtail is generally applicable to all the species. 'It is,' says Mr. Yarrell, 'ever in motion, running with rapidity by a rapid succession of steps in pursuit of its insect food, moving from place to place by short undulating flights, uttering a cheerful chirping note while on the wing, alighting again on the ground with a sylph-like buoyancy, and a graceful fanning motion of the tail, from which it derives its name. It frequents the vicinity of ponds and streams, moist pastures, and the grass plots of pleasure-grounds; and may be frequently seen wading in shallow water, seeking for various aquatic insects or their larvæ.'

The nest of the British Pied Wagtail is made up of moss-fibres, withered grass, and moss; the lining consists of hair and a few feathers. A bank, a hole in some old wall, the thatch of a cart-shed or other farm-building, faggot-piles or woodstacks, and hayricks, are all localities where it is generally placed, and almost always near water.

'While the cows are feeding,' says White, 'in the first low pastures, broods of wagtails, white and gray, run round them, close up to their noses, and under their very bellies, availing themselves of the flies that settle on their legs, and probably finding worms and larvæ that are roused by the trampling of their feet. Nature teaches an economist, that the most incongruous animals may avail themselves of each other! Interest makes strange friendships.'

The habits of the continental *Motacilla alba* are similar to those of our Pied variety.

WAHABEES, WAHABYS, or WAHABITES, a Mohammedan sect, founded by a learned Arabian, Ibn-el-Wahab, son of an Arab sheikh, born in the Persian Nijd, or Highlands, towards the end of the eighteenth century. His daughter married Mohammed Saoûd, the chief, or at all events, the ruling spirit, of the town and territory of Derayeh, who became his convert and leader of the sect about 1760, and whose example was speedily followed by all his followers and kindred. The object of the new propagandism was to sweep away the corruptions, both of doctrine and practice, which had accumulated about the pure religion of Islam, to restore the authority of the Koran, and to give a spirit of devotion, faith, and enthusiasm; and for these purposes the Wahabees, like the prophet whom they revered, appealed to the sword.

Saoûd (who died in 1765), and his son, Abd-el-Asiz, pushed forward their crusade with restless vigour, and successfully carried their arms to the utmost limits of Arabia. The Turkish authorities attempted in 1797 to check the progress of this new orthodox heresy, but were easily defeated; and in 1801 Ibn Saoûd, the leader's grandson, led his warriors against the holy city of Kerbela, captured it and its treasures, massacred the majority of its inhabitants, and repulsed a Turkish expedition intended for its relief. Extending their ravages to Syria, Irak, and Mesopotamia, the Wahabees increased in power and prosperity. In 1803 they took Mecca, and subjugated the Nidjaz. Medina afterwards fell before their victorious arms, and all access to it was forbidden to the Turkish pilgrims. Abd-el-Asiz having been assassinated by a Persian fanatic, he was succeeded by Saoûd in 1804, who had previously distinguished himself by his military capacity, and whose handsome person procured for him, among the Arabs, the sobriquet of Abou Showareb, or the 'Father of Mustachios.' He addressed himself with great energy to the development and consolidation of his power; but his ravages on the Persian coast bringing him into collision with Great Britain, his freebooters were severely chastised, and his plunder of the Holy Cities having provoked the indignation of the whole Moslem world, Mehemet Ali, the pasha of Egypt, was charged with the conduct of a new campaign against him.

In 1812 Medina was captured by the Egyptians; in 1813, Mecca. Years of hostility followed, in which no very decisive victory was gained by either party, until the death of Saoûd in 1814 deprived the Wahabees of their able leader. His successor, Abdallah, exercised a less dominant influence over the numerous tribes which acknowledged his sway; and internal dissensions facilitated the progress of foreign invasion. In 1818 Ibrahim Pasha penetrated as far as Derayeh, which he captured, and reduced to ruins. Abdallah and his principal councillors were then despatched to Constantinople, where they were soon afterwards beheaded. Meanwhile, Ibrahim Pasha completed the subjugation of the Nijd, appointed a vice-governor over it, and returned to Egypt.

For a time it seemed as if the spirit of the Wahabees was utterly cowed, but the tyranny of their Egyptian rulers once more roused the dormant courage and fanaticism of the people. They broke out into open rebellion; declared Turki, a son of Abdallah, their sultan; established their seat of government at Riadh; and commenced a gallant and protracted struggle for independence. Eventually, under the leadership of Feysul, Turki's son and successor, they recovered their supremacy in Central Arabia, and it has been consolidated and extended by the present imaum or emir, Abdallah II., who is described by Palgrave, the great Arabian traveller, as a man of singular capacity, energy, and religious zeal. He has carried his victorious arms along the coast of the Persian Gulf, and his successes have been watched, if not with uneasiness, certainly with vigilance, by the government of British India.

The religion of the Wahabees is unadulterated Mohammedanism. They chiefly observe the tenets of the Koran, and regard with indignation the innovations and immoral license of the Turks. Their government is theocratic, and its atmosphere sheer despotism—a despotism moral, religious, physical, and intellectual. It appears incapable of true internal progress, but admirably adapted for wars of conquests. Like a bond of iron it holds together numerous tribes which differ largely in character and disposition, and which, should this bond be shattered by feuds of succession, as seems most probable, will again split up into independent and even hostile communities.

The chief information which Englishmen possess respecting this remarkable people, who may be characterized in one word as Neo-Mohammedans, is derived from the recently published *Journey in Central Arabia* by Mr. W. G. Palgrave, and from the *Visit to the Wahabee Capital*, by Lieutenant-colonel Pelly, the agent of the British government of India, and political

resident for the Persian Gulf; *Journal of Royal Geographical Society*, 1865.

From these authorities we gather that the Wahabee empire includes 11 provinces, 316 towns or villages, and a population of 1,219,000 souls, capable of putting into the field a fighting force of 47,300 men.

Provinces.	No. of Towns.	Population.	Fighting Men.
1. Aared, ...	15	110,000	6,000
2. Yemamah, ...	32	140,000	4,500
3. Harik, ...	16	45,000	3,000
4. Aflaj, ...	12	14,000	1,200
5. Wadi Dowasir, . .	50	100,000	4,000
6. Seley'yd, ...	14	30,000	1,400
7. Woshem, ...	20	80,000	4,000
8. Sedeyr, ...	25	14,000	5,200
9. Kasim, ...	60	300,000	11,000
10. Hasa, ...	50	160,000	7,000
11. Katif, ...	22	100,000	—
	316	1,219,000	47,300

Among the leading towns are Riadh, the capital (lat. 24° 38′ 34″ N., long. 46° 41′ 48″ E.), population, 40,000; Oneizah, 30,000; Bereydah, 25,000; Al-Hufhuf, 24,000; Toncim, 14,000; and Mejmaâ, 12,000. The port of Khatif (population, 10,000) is situated on the west coast of the Persian Gulf.

WAHL CAPITULATION (Germ. *wahl*, 'an election'), in modern History, the covenant which, on occasion of his election, an emperor of Germany made with his electors; and by whose stipulations he undertook to respect the rights and privileges of the empire and the diet, to enforce the conditions of the peace of Westphalia, and to preserve the imperial territory intact.

WAHLENBE'RGIA, a genus of plants belonging to the natural order *Campanulaceæ*, whose species, of which above fifty have been described, consist chiefly of herbs, which are for the most part annual. They are most abundant in the southern hemisphere, and are particularly numerous at the Cape of Good Hope. The following are a few of the most remarkable forms:—

W. graminifolia, Grass-leaved Wahlenbergia, is a native of Sicily, of the south of Italy as far as Rome, and of the island of Zante. *W. Capensis*, Cape Wahlenbergia, with many others of the genus, belongs to the Cape of Good Hope. *W. hederacea*, Ivy-like Wahlenbergia, is found in the west of Europe and of North America: it is abundant in Great Britain in Cornwall and Sussex, and also in Epping Forest. It is indigenous in Scotland and Ireland. *W. gracilis*, Weak Wahlenbergia, is a native of Australia about Port Jackson, of Van Diemen's Land, and New Zealand. Four or five varieties of this species have been recorded. *W. cervicina*, Throatwort, is a small plant, a native of Egypt, and also of Senegal in dry sandy places. *W. foliosa*, Leafy Wahlenbergia, is one of a group of the species named *Nesophila*, on account of their inhabiting islands. It is found on the islands of St. Helena and Ascension.

WAIF. If the goods of any person were stolen, and the thief, thinking that pursuit was made after him, fled, and during his flight waived or abandoned the goods, they became waif, and were forfeited to the king. The king could grant the right of waif to others; and many lords of manors were entitled to waif by prescription or presumption of an ancient grant to that effect.

It was necessary, in order to complete the title of the king or lord of the manor to waif, that it should be taken possession of by some one on his behalf; otherwise the original owner was not barred from recovering his goods at any time, and if he seized them it remained his property.

Lord Coke distinguishes between waif with stolen property, and the goods which were the of a person who fled for a felony, which go always forfeited on proof and finding by a jur fact of flight, even though the party were of the felony. By 7 & 8 Geo. IV. c. 29, s. court before whom a prisoner is convicted has all cases, without restriction as to time, to ma tution of stolen property to the owner, exce negotiable instruments in the hands of part without notice, have given value for them: a & 8 Geo. IV. c. 28, s. 5, the jury are no long charged to inquire whether a prisoner fled for fe felony, and there is now no forfeiture for such fl

WAINAMOINEN, EPIC OF, a poem, entitled wala,' which has recently been recorded in writi the oral traditions that have existed for centuries the Finns. Its theogony resembles the so-called in its general character, and its merits as a po praised by Max Müller in language which may, p be suspected of exaggeration. In many points he it not unworthy of comparison with the Homeri

WAINSCOT, in Architecture, is the framed li panels with which a wall is faced.

WAIST (Welsh, *gwâsg*), that part of a ship's deck which extends between the fore and main m

WAITS (perhaps from the German *wacht*, 'wa or 'waking'), the popular name for the itinerant cians who play in the streets and villages of E during the Christmas holidays, and are rewarded contributions of the charitable. The practice is a antiquity, a regular company of Waits having established at Exeter as early as 1400; but th seems at one time to have been applied to their instruments, at another to the music, and latt the musicians.

WAIVER (from Saxon *wafian*, 'to abandon,' up'), a legal term, signifying that the plaintiff fendant refuses to accept or to avail himself of thing, as, for example, of some mistake or ano irregularity which in strictness he might have cal to his advantage.

WAIWODE, or VAIVODE, the governor of province or town in the Turkish empire.

WAKEFIELD. [YORKSHIRE.]

WAKEFIELD, EDWARD GIBBON, a writ high authority on the question of colonization, w son of Mr. Edward Wakefield, author of 'I Statistical and Political,' and was born about the ning of the present century. In 1833 he pub 'England and America,' a comparison of the p state of both nations, in which he discussed wh considered the true theory of colonization. In he published another work on the same subj which he unfolded his views more fully; and two later took an active part in founding the now flou towns of Nelson and Wellington, in New Zealan 1839 he accompanied the late Earl Durham to C as his private secretary. Mr. Wakefield resided for years on the Continent, and died there in 1863.

WAKEFIELD, REV. GILBERT, was born Feb 22, 1756, in the parsonage-house of St. Nicho Nottingham. In his seventeenth year he was s Jesus College, Cambridge, where he applied hi almost exclusively to classical studies. In Jan 1776, he took his bachelor's degree, and in the following he was elected to a fellowship in his co

In March, 1778, he was ordained deacon. From his early years he was attached to the study of theology; but even at the time of his ordination he was dissatisfied, as he says, 'with the requisition of subscription and the subjects of that subscription themselves.' Before the end of 1778 he was curate of St. Peter's, in Liverpool, and in the following year he married. At Liverpool he continued his theological studies, and his 'objections to the creed of his forefathers were daily multiplying.'

In August, 1779, on the invitation of the trustees of the dissenting academy at Warrington, he removed thither to fill the situation of classical master in that establishment. While here he published, in 1781, 'A New Translation of the First Epistle of Paul the Apostle to the Thessalonians,' and various other works. At Warrington, where he remained until 1783, he prosecuted the study of Hebrew, learned Syriac and Chaldee, acquired a perfect knowledge of the Samaritan and Syro-Chaldaic, formed some acquaintance with the Æthiopic, Arabic, and Persian, and read the Coptic version of the New Testament. He next published anonymously, at London, the first volume, in 8vo, of his 'Enquiry into the opinions of the Christian Writers of the Three First Centuries concerning the Person of Jesus Christ,' a work which he never carried farther. From this time he left the established church, and became its bitter assailant, although he never joined any body of dissenters.

About the close of 1791 he published, at London, one of his chief works, his 'Translation of the New Testament, with Notes,' in 3 vols. 8vo. His edition of Lucretius, perhaps his best classical production, was completed in 1797, in 3 vols. 4to. In January, 1798, appeared 'An Address to the People of Great Britain,' by Watson, bishop of Llandaff, in praise of the war with France. Wakefield immediately wrote a vehement 'Reply to some parts of the Bishop of Llandaff's Address,' which was published by John Cuthell, of Middle Row, Holborn. Cuthell, who knew nothing of the nature of the pamphlet, was indicted for publishing a seditious libel, tried before Lord Kenyon in February, 1799, convicted, and fined. Wakefield repaid him all the expenses to which he had been put by this unlucky pamphlet. Both author and publisher were tried at Westminster on the same day, and found guilty. The former was sentenced by Justice Grose to be imprisoned in Dorchester gaol for two years, and to give security for his good behaviour for five years after the expiration of that term, himself in 500*l.*, and two others in 250*l.* each. A subscription was immediately raised for him among the friends of opposition politics, which ultimately amounted to about 5000*l.* He was released on the 29th of May, 1801; upon which he hastened to London, and commenced a course of lectures on the second book of the 'Æneid,' the delivery of which occupied him till the beginning of July. On the 27th of August he was taken ill of typhus fever, which carried him off on the 9th of September. He left a widow, and four sons and two daughters.

A new edition of Wakefield's Memoirs, in 2 vols., brought down to the close of his life, was published in 1804.

WAKES (Ger. *wachen*, Lat. *vigilare*, 'to watch') is the popular English equivalent for the ecclesiastical term, *vigil*. The 'wake' or 'revel' of a country parish was, of old, the day of the week, and afterwards, the day of the year, on which the church had been dedicated. On these occasions the population gave themselves up to wholesale revelry. Rushes and flowers were scattered on the floor of the church, and the altar and pulpit were garlanded with leaves and blossoms. In the churchyard tents were erected to provide a liberal supply of 'cakes and ale,' and the people disported themselves in all kinds of games and athletic exercises. These amusements occasionally drew together large crowds, and the large crowds attracted a legion of hawkers and merchants, until the 'wake' or dedication festival degenerated into a common fair, without any religious element in it. To remedy some of their more glaring evils Edward I., in 1285, passed a statute forbidding them to be held in churchyards; and in 1448 Henry VI. enacted that no display of wares and merchandise should be allowed on the great festivals of the church. A further attempt to regulate them was made by Henry VIII. in 1536, who appointed that the wake should be held in every parish on the same day, the first Sunday in October, but the enactment was never generally observed. In the 'Book of Sports' of Charles I., wakes are expressly mentioned among the feasts which should be observed, and though the custom, since the Restoration, has gradually declined, it still holds good in some of our rural parishes.

A *lyke* or *liche* wake (Saxon, *lie*) is a watching of a corpse all night by the deceased person's friends, relatives, and neighbours. It is now disused, except among the lower orders of the Irish, who invariably celebrate the occasion with liberal potations. (Brand, *Popular Antiquities.*)

WALCHEREN. [ZEALAND.]

WALCHIA, a genus of fossil plants, allied to *Lycopodium*, belonging to the coal measures.

WALDECK, formerly a principality in the north of Germany, situated between 51° 4′ and 51° 31′ N. lat., 8° 31′ and 9° 12′ E. long., and lying between Westphalia, Hesse-Cassel, and Prussia, has an area of 427 square miles, and a population in 1866 of 52,000, nearly all Protestants. It is a mountainous country, without any wide valleys. The climate is colder than that of Hesse under the same latitude; but the air is pure and healthy. The soil is in general stony and sterile, yet the industry of the inhabitants raises corn, potatoes, and flax enough for their own use. There is a great quantity of timber; and in some parts good pastures, on which numerous herds of cattle are fed, and considerable quantities of butter and cheese are made. Sheep and swine are kept in large numbers. The minerals are copper, iron, lead, alabaster, marble, slate, freestone, and salt. The inhabitants make some coarse woollen cloths and linen for their own use, but none for exportation. Leather, paper, and iron are also manufactured in considerable quantities. The county of Pyrmont belongs to Waldeck. It is situated about 30 miles to the north, has an area of 25 square miles, and a population of 7000; so that the entire area of the country is 452 square miles, and the population 59,000. The town of Pyrmont is celebrated for its mineral springs. [PYRMONT.] The House of Waldeck was one of the oldest in Germany, and their estates were at one time very extensive. At the Congress of Vienna in 1815 the above territory was assigned to them on account of the distinguished services rendered by Field-marshal Prince George of Waldeck, in the wars against France. From that time to 1866 Waldeck formed part of the Germanic Confederation. After the battle of Sadowa it was for a short time a member of the North German Confederation, but by a treaty which came into operation in 1868 is now virtually annexed to the kingdom of Prussia.

WALDENSES. [VAUDOIS.]

WALES, a principality of Great Britain, lies on the west side of the island, between 51° 20′ and 53° 25′ N. lat., and 2° 41′ and 5° 18′ W. long. It is bounded W. and N. by St. George's Channel, E. by Cheshire, Shropshire, Herefordshire, and Monmouthshire, and S. and S.E. by the Bristol Channel. Its greatest length N. to S. is about 180 miles; its breadth E. to W. varies from 50 to 80 miles. It contains 7426 square miles, or 4,734,486 acres. A general description of the surface, together with the area and population of each county, are given under GREAT BRITAIN, and the counties and chief towns are described under their respective names. In consequence, however, of its very intimate connection with England, and its marked physical features, it may be as well to give a short additional description here.

Physical Aspect.—Wales consists of a peninsula, with the island of Anglesey situated at its N.W. extremity, and separated from it by the Menai Strait (now crossed by two very remarkable bridges), and with numerous smaller islands chiefly at a short distance from the S.W. coast. The surface is very mountainous, particularly in the north, where Snowdon, the culminating point of South Britain, rises to the height of 3590 feet; it is intersected by beautiful valleys, traversed by numerous streams, including, among others, the Severn, which has its source within the principality; and is rich in minerals, particularly copper in the N., and coal and iron in the S. Slate also abounds in the N. The Silurian formation covers more than two-thirds of the whole area, extending continuously from the mouth of the Conway to the vicinity of St. David's Head; but is succeeded in the S. by the old red sandstone, above which lies, first the mountain limestone, and then a large and valuable coal-field.

Rivers, Soil, and Climate.—Besides the Severn, the principal rivers are the Dee, which has part of its lower course in Cheshire; the Clwyd, in Denbigh and Flint; the Conway, forming the boundary between Denbigh and Caernarvon; the Dovey, and the united Rheidiol and Ystwith, which have their mouths near the centre of Cardigan Bay; the Teify, separating Cardigan on the N. from Caermarthen and Pembroke on the S.; the Cleddy and Cledden, remarkable chiefly from contributing, by their junction, to form the splendid estuary of Milford Haven; the Towy and Bury, which both fall into Caermarthen Bay: the Ebry and Taff, which have a common estuary in the Bristol Channel; the Romney, which forms part of the boundary between Wales and England; and the Usk and Wye, which, though rising in the principality, have only the first part of their course within it. The lakes are numerous, but the largest, that of Bala, is only 4 miles long, and scarcely 1 broad. The climate is on the whole moderate and equable, though somewhat keen in the loftier districts. In all the counties, but more especiallly on the sea-coast, humidity is in excess, the average fall of rain being 34 inches, while that in England is only 22. Hence both climate and surface concur in rendering Wales much better adapted to pasture than agriculture. The soil seldom possesses great natural fertility, except in some of the vales, of which those of the Clwyd in the N., and of Glamorgan in the S., are celebrated for productiveness. The latter, rather a plain than a valley, is of great extent, and produces excellent wheat. The total acreage under all kinds of crops in 1866 was 2,284,674, or less than one-half of the entire area—1,257,721 acres being permanent pasture, meadow, or grass land; while only 521,074 were devoted to corn, and 139,265 to green crops. Wheat was grown on 113,862 acres; barley on 146,323; oats on 251, rye, beans, and peas, on 8996; potatoes on 44, turnips and swedes on 62,442; mangold on 3 vegetables on 1624; vetches, &c., on 27,069; and artificial grasses on 256,722; hops on 14; 109,878 acres were lying fallow. The number of sh the country at the same time was returned at 1,668, and the estimated ordinary stock of cattle amount 546,966. Some progress has been made in the s of agriculture of late years, but as yet the most imp methods of cultivation have been but rarely ad The farms are generally small, and more than one- of them are tilled by the occupiers without the assis of labourers. A hardy breed of small ponies is re especially in the counties of Merioneth and Montgo

Manufactures and Commerce.—The principal ma facture is that of iron, which is chiefly confined to Gla ganshire. Large quantities of ore are raised in t county, where some of the most extensive smelting f naces in Great Britain are to be met with. The princi iron works are at and around Merthyr Tydvil, Tredeg and Aberdare. Copper ore, brought from Cornwall a other parts of England, from Ireland, and foreign co tries, is smelted in immense quantities at Swansea. T great coal-field of South Wales affords employment to large number of hands; and besides being locally ne in the iron manufactures and copper smelting, the pr duce is exported from Cardiff and other ports to a parts of the world, being especially adapted for steamers North Wales also yields coal and iron, from the vicinit of Wrexham and Ruabon in Denbighshire. Lead (wit some silver ore) and copper are raised in Anglesey, Cardiganshire, and other parts of Wales, as well as larg quantities of slate, limestone, and marble. Various manufactures in lead, iron, copper, and brass are carried on at Holywell, in Flintshire. The principality has long been famous for its flannels, which are manufactured in large quantities in Montgomeryshire, and other parts of the north; stockings, coarse cloth, cotton goods, and flax are also made there.

The commerce consists principally in the export of mineral produce, slates, cattle, and wool. The principal ports are Swansea, Newport, Cardiff, Caernarvon, and Beaumaris, besides which Holyhead is a chief packet station for communication with Ireland, and Milford is a naval port, and the seat of a government dockyard. The roads through the principality are generally good, and all parts, except the very centre, are now traversed by railways. In the S. the lines are very numerous, owing to the extent of the mineral traffic.

Divisions.—Wales is in the ecclesiastical province of Canterbury, and is divided into the bishoprics of Llandaff, St. David's, Bangor, and St. Asaph. Since the Reform Bill of 1867 it is represented in the House of Commons by thirty members, viz.:—Two each for the counties of Caermarthen, Denbigh, and Glamorgan; one each for the counties of Anglesey, Brecon, Cardigan, Carnarvon, Flint, Merioneth, Montgomery, Pembroke, and Radnor; two for the borough of Merthyr Tydvil; and one each for the several districts of boroughs, of which the principal or returning boroughs are Beaumaris, Brecon, Caermarthen, Cardigan, Caernarvon, Denbigh, Flint, Cardiff, Swansea, Montgomery, Pembroke, Haverfordwest, and Radnor.

Since the passing of the 11 Geo. IV. and 1 Wm. IV. c. 70, Wales has no jurisdiction in legal matters distinct from England. It is divided into two circuits—North Wales and South Wales—and one judge tries each. North Wales includes Anglesey, Caernarvonshire,

Denbighshire, Flintshire, Merionethshire, and Montgomeryshire. South Wales includes Brecknockshire, Cardiganshire, Caermarthenshire, Glamorganshire, Pembrokeshire, and Radnorshire.

History.—The origin of the names Wales and Welsh is uncertain. Taliesin, a Welsh bard of the sixth century, styles his country Wallia. The term Cambria, another and frequent name for Wales, is probably derived from Cymri, one of the two great families into which the Celtæ appear to have been divided.

The history of Great Britain up to and during the period of the Roman domination is given in the article BRITANNIA.

After the Romans had left the country, the Cambro-Britons were driven back by the Saxon races into the mountainous districts of Wales, where, under a variety of princes, they were engaged in almost constant warfare with the Angles of Bernicia, Deira, and Mercia; the Saxons of Wessex; and the Gwizzelians of Ireland.

Towards the end of the eighth century the Mercians succeeded in driving the Welsh from the border territory, and Offa, king of Mercia, made an artificial boundary from the mouth of the river Dee on the north, to the Wye on the south, known by the name of Clawdd Offa, or Offa's Dyke, traces of which are still to be found along a great part of the line. With this exception, no permanent footing was obtained in Wales, though Egbert, king of Wessex, gained some important victories in 828, and penetrated as far as Snowdon; but the incursions of the Danes, by calling away the Saxons, left the country for some time in tranquillity. Roderic, who had acquired the sovereignty of nearly all Wales, in 843 divided his dominions into three principalities, to which his three sons succeeded. One of these principalities was called Gwynedd, and corresponded nearly to the present North Wales; another, Ceredigion and Dyved, or South Wales; and the third Powys, comprising parts of Montgomeryshire, Shropshire, and Radnorshire. Other smaller tracts were occupied by various princes.

In the tenth century an annual tribute of money was imposed on the Welsh, by Athelstan, king of England, who had also obtained the nominal dominion of Wales. On the accession of William the Conqueror the Welsh refused to pay tribute, upon which he invaded their country with a considerable army, reduced them to submission, and compelled their princes to do homage and to take an oath of allegiance as his vassals.

But the conquest of Wales was far from complete. William the Conqueror and his successors made grants to their dependents of such lands as they might seize in the country, and thus by degrees the greater part of South Wales and Powys came into the possession of the English. North Wales, however, was not subdued till the reign of Edward I., when Llewellyn, prince of that portion, having refused to do homage to the king of England, Edward invaded the country, and forced him to sue for peace in 1277. In 1281 Llewellyn again rose in arms against the English, but was himself killed, and his soldiers defeated, December 11, 1282. His surviving brother, Prince David, who succeeded him in the principality, was soon afterwards executed at Shrewsbury as a traitor. The nobility then submitted to the conqueror, and by the statute of Rothelan, passed in the twelfth year of Edward's reign, the country was incorporated and united with England. The title of Prince of Wales was bestowed by the king upon his son, afterwards Edward II., and has ever since been conferred on the eldest son of the English sovereign.

By the statute of Rothelan a part of Wales was formed into the counties of Anglesey, Caernarvon, Merioneth, and Flint; and by an Act passed in the twenty-seventh year of the reign of Henry VIII., various lordships in the Marches were united to English or Welsh counties, and the remainder divided into the new counties of Monmouth, Brecknock, Radnor, Montgomery, and Denbigh. Although their country had been incorporated with England for so many centuries, until very recently the Welsh were an entirely distinct people, both in language and manners, and still give undeniable evidence of a Celtic origin. Their dialect bears a marked affinity to the Gaelic or Erse, but is much more closely allied to the ancient Cornish, and that which is still exclusively used by the peasantry in the west of the French province of Bretagne. The introduction of railways and the freer intercourse thus established between England and Wales has led to a very general knowledge of the English language being diffused throughout the country during the last thirty years; but the native dialect is still spoken in the more remote districts, and even cultivated Welshmen are proud to possess a thorough knowledge of their ancient tongue as well as of English. There is strong reason to believe that the Welsh are the descendants of the ancient *Cimbri*, whence *Cymry*, the name by which they often speak of themselves at the present day. These, though called a German nation, appear to have been of Celtic origin, and quite a distinct people from the Teutones, with whom they invaded Italy, about 100 years B.C. It is supposed that after their great defeat by Marius, many fled into the mountains, and that from a portion of these have sprung the Waldenses. [VAUDOIS.] Another remnant established themselves in Brittany (Bretagne), which will account for the very close resemblance between the provincial dialect of that part of France and Welsh, already mentioned.

The Welsh is one of the most ancient languages now spoken in Europe; and has a literature, composed chiefly of the poetical effusions of bards, some of whom flourished as early as the sixth century, but partly also of prose, of which the translation of the Bible, completed in 1588, is considered one of the best specimens. [WELSH LANGUAGE AND LITERATURE.] Among the striking peculiarities which formerly characterized the people was the female dress, consisting generally of a plain or checked gown, a mantle, a napkin of gay flaunting colours around the neck and shoulders, and a black beaver hat, either cylindrical, like that worn elsewhere by men, or broad-brimmed and tapering to the form of a truncated cone. This costume has, however, now nearly died out, being worn only by a few old people in the remote districts of the north. All classes in Wales are distinguished by civility and hospitality, and crime is exceedingly rare. Some curious superstitions, handed down by immemorial custom, still retain their hold, and the imposture of Mormonism has found many followers, particularly in the mining districts; but in addition to the labours of the established clergy, those of the Methodists have been signally successful in diffusing a knowledge of Christianity; and the great body of the people belonging to what are called the Calvinistic Methodists, find one of their principal sources of enjoyment in the primitive services of their church, or in the Sunday school almost invariably attached to it. Memorials of the past history of Wales abound in the form of cromlechs, camps, abbeys, castles, and other antiquities.

WALES, NEW SOUTH. [NEW SOUTH WALES.]

WALES, PRINCE OF, is the title usually borne by the eldest son or heir apparent of the king or queen

regnant of Great Britain and Ireland. Before the reign of Edward I. the eldest son of the king was called the Lord Prince. Edward I. having conquered, in 1277, Llewellyn and David, the last native princes of WALES, and united the principality with the crown of England, invested with it his son, Edward of Caernarvon, then an infant, and caused the barons and great men to do him homage. Edward was not at that time the king's eldest son, but on the death of his brother Alphonso he became heir apparent, and from that period the name of Prince of Wales has ever been borne by the eldest son of the sovereign. The title is conferred by special creation and investiture. The eldest son of the king or queen regnant is also by inheritance Duke of Cornwall. His titles are 'Prince of Wales and Earl of Chester, Duke of Saxony, Duke of Cornwall and Rothesay, Earl of Carrick, Baron of Renfrew, Lord of the Isles, Great Steward of Scotland.'

WALHALLA. [VALHALLA.]

WALKER, JOHN, was born at Colney Hatch, Middlesex, March 18, 1732. He was an actor until 1767, when he quitted the stage, and joined Mr. James Usher in establishing a school at Kensington Gravel-pits. This partnership lasted about two years, after which Walker set up for himself as a teacher of elocution, and gave lectures in different parts of England. The settlement of the pronunciation of the English language was an object to which he devoted a great part of his attention. Walker was brought up a Presbyterian, but in his latter days he became a very strict Roman Catholic. He died in August, 1807. The work by which he is best known, his 'Critical Pronouncing Dictionary and Expositor of the English Language,' was first published in 1792, and there have since been many editions of it, though it is no longer an authority. His latest publication was 'Outlines of English Grammar.'

WALKER, ROBERT, an English portrait painter, contemporary with Vandyck, who was liberally patronized by Cromwell. He painted several portraits of the Protector, and those of most of his officers, military and naval. One of the Cromwell portraits was formerly preserved in the Pitti palace at Florence.

Walker had for some time apartments in Arundel House: he died a little before the Restoration. There is a portrait of him by himself in the picture-gallery at Oxford, and there was another at Leicester House: there is also a good print of the artist, holding a drawing, by Lombart.

WALKE'RA, a genus of plants named after Richard Walker, D.D., who was founder of the botanic garden at Cambridge. It belongs to the natural order *Ochnaceæ*; is a native of Malabar and Ceylon and has yellowish flowers and reddish fruit. The roots and leaves are very bitter. *W. integrifolia* belongs to French Guiana.

WALL-CREEPER. [CREEPER.]

WALL-CRESS, the common name of the plants belonging to *Arabis*, an extensive genus in the natural order *Cruciferæ*. Nearly seventy species have been described. They are most of them small plants, fond of growing in dry stony places and on walls, and hence their English name. Several are natives of Great Britain, and many of them are cultivated in gardens on rock-work and flower-borders, on account of their blooming early in spring.

WALL-FLOWER, the common name of *Cheiranthus*, a genus belonging to the natural order *Cruciferæ*. Many of the species exhale a delicious odour, and are great favourites in gardens. The most plentiful is the *Cheiranthus cheiri*, the Common Wall-flower, which is found wild throughout Europe, on old walls and in stony places. The general colour is a brown yellow, or as a poet has called it, the 'yellow wall-flower stained with iron-brown.' It is, however, subject to considerable varieties of hues even in its wild state, and these are much increased by cultivation. On account of its scent, it has been transferred from ruined walls to the flower borders of gardens, and there, by the doubling of its flowers, and the variations of its colours, a number of distinct varieties have been produced.

Several other species of this genus have been described, and occasionally found in collections in gardens in this country. In their cultivation, the hardy shrubby species, such as the common wall-flower, may be propagated by cuttings, which soon strike root when planted under a hand-glass; other perennial species will permit of growth by dividing the roots. The annual species may be sown in the open border or on rock-work, where they will flourish, and most of them will survive the winter in such a situation.

WALL-PELLITORY, the common name of the *Parietaria officinalis*, a plant belonging to the natural order *Urticaceæ*. *P. officinalis*, Wall-pellitory, is common throughout Europe, and is found in Great Britain on old walls and in waste places among rubbish. The stems of the plant are often procumbent upon the wall on which it grows, and are of a reddish colour. The flowers are small, hairy, of a purplish green colour, and clustered in the axils of the leaves. The leaves are furnished with minute hairs, which under some circumstances have a stinging power, similar to many plants of the order to which they belong.

WALL-RUE. [ASPLENIUM.]

WALLACE, WILLIAM, the famous Scottish patriot, sprung from an ancient family of Anglo-Norman descent, which settled in Renfrewshire and Ayrshire in the reign of David I. He was the second son of Sir Malcolm Wallace of Elderslie, near Paisley, but the precise date of his birth is unknown. When the patriot himself was very young, his father and elder brother were slain in some of the skirmishes of the times, and he was educated at Dunipace in Stirlingshire by his uncle, a patriotic priest, by whom the love of freedom and of his country was early instilled into his mind. At this period Scotland was suffering great misery under the tyrannical domination of Edward I.; and at a very early age Wallace manifested a strong dislike to the oppressors of his country. The incident which finally caused him to take up arms against his country's oppressors arose out of a quarrel between him and some English officers in Lanark, where he was then residing (1297). From this period he devoted himself to the task of redressing his country's wrongs; and having gathered around him a body of fierce and determined men, carried on against the invaders a kind of guerilla warfare, for which the district round Lanark was well fitted.

The fame of his exploits awoke the dormant spirit of some of the Scottish nobles; and while, by a rapid march on Scone, he surprised and routed Ormesby, the English justiciary, and obtained a rich booty, Sir William Douglas, a brave and powerful baron, captured the castles of Disdeir and Sanquhar, and then uniting their forces, he and Wallace marched to the west of Scotland, and soon wrested almost every fortress in that district from the enemy. The fame of these successes attracted the steward of Scotland, the bishop of Glasgow, Sir Andrew Moray of Bothwell, and other powerful barons, to the patriotic standard; and even the younger Bruce, earl of Carrick, who had hitherto adhered to the

English interest, was induced to embrace the popular cause. The tidings of this formidable insurrection armed Edward for the security of his newly-acquired dominions, and he promptly sent an army of 40,000 men, under Henry Percy and Robert de Clifford, to crush the insurgents. Wallace and his associates had taken up a strong position in the neighbourhood of Irvine, and prepared to give battle to the enemy; but dissensions unfortunately arose among them. The ambition and untractable pride of the barons made them unwilling to submit to the leadership of a man who, however brave and skilful, was their inferior in rank. The confederacy fell to pieces like a rope of sand; the Steward, Bruce, Douglas, and their friends made their submission (9th July, 1297), while Wallace and Sir Andrew Moray, who alone had resolutely opposed this disgraceful transaction, retired to the north, accompanied by their own personal adherents. In a short time the patriot was joined by a number of the tenants of the crown and church lands, and even by many of the vassals of the barons who had made their peace with Edward; and while the English commanders remained inactive at Irvine, apparently under the impression that the insurrection was at an end, Wallace captured in rapid succession the castles of Dunnotar, Forfar, Brechin, and Montrose, and the city of Aberdeen. He was engaged in besieging the castle of Dundee when tidings reached him that a powerful army of the English, under the earl of Surrey, and Cressingham the treasurer of Scotland, was on its march to Stirling. Wallace immediately hurried to that town in order to guard the passage of the Forth, and took up a strong position on a rising ground near the Abbey Craig, which commanded the bridge of Stirling.

Here he gained a brilliant and decisive victory, which was followed by the surrender of Dundee, and the other chief strongholds in the kingdom. But the miseries of his devoted country continued to increase, and, in addition to the horrors of war, a grievous famine, followed by a pestilence, cut off great numbers of the people. Wallace sought by various judicious regulations to mitigate these sufferings, and resolved to invade the northern counties of England, both to make reprisals on the enemy, and to feed his famishing countrymen at home with the plunder which he might obtain. He accordingly crossed the border at the head of a small but resolute force, wasted with fire and sword the counties of Northumberland and Cumberland, which he rendered little better than a wilderness, and unmolested led back his forces to his own country laden with booty. Soon after his return from this successful expedition (1297), Wallace, in an assembly of the principal nobility held at the Forest-kirk in Selkirkshire, was chosen guardian of the kingdom in the name of King John. In the summer of 1298 Edward I. in person invaded Scotland, at the head of 7000 cavalry and 80,000 infantry. The efforts of Wallace to resist this formidable invasion were greatly hindered by the mean and selfish jealousy of the Scottish barons, who were envious of his military renown and influence.

The plan which he had formed for the defence of the country was marked by great sagacity, and often in subsequent times proved successful against far superior numbers. He resolved to avoid a general engagement with the invaders, but to hang upon their line of march, to drive off all the supplies, waste the country through which they were to advance, and when they should be compelled to retreat by privation and the failure of provisions, to harass them by incessant attacks. This

scheme was for a time attended with complete success. Edward advanced through Berwickshire and Midlothian to the neighbourhood of Linlithgow, without being able to discover or to obtain any information respecting the invisible foe. His army began to suffer severely from the want of provisions; an alarming mutiny broke out in his camp, and he was compelled to issue orders for a retreat. At this critical juncture, two treacherous nobles, the earls of Dunbar and Angus, gave secret information respecting the plans of Wallace, and the position of the Scottish army; and on the following day (22nd July) the king attacked them in the neighbourhood of Falkirk with overwhelming numbers, and after a desperate conflict, completely defeated them with the loss of 15,000 men.

Wallace now resigned the office of guardian of the kingdom, finding that his measures for its defence were hindered or defeated by the jealous and factious spirit of the great nobles. He did not, however, retire from the contest in disgust, or despair of his country's cause. But seeing no immediate prospect of doing any good at home, he repaired to France for the purpose of soliciting aid from the French king. Meanwhile, Edward repeatedly invaded Scotland at the head of powerful armies, until the spirit and resources of the country were both exhausted. In 1304 the Regent Comyn and his associates made their submission on certain stipulated conditions. To seven other patriotic leaders, terms more or less severe were offered; but from Wallace, who had recently returned from France, an unconditional surrender was required. The patriot hero continued for some time to carry on the struggle single-handed, and found refuge among the moors and marshes of his native country. But Edward, conscious that his dominion over Scotland was not completely established so long as Wallace lived and was at large, set himself with characteristic perseverance to hunt him down. The English governors in Scotland were enjoined to make a strict search for the hero; spies and traitors were employed to discover his haunts; and large rewards were offered for securing his person dead or alive. These measures were at length successful. According to the unvarying testimony of Scottish history and tradition, Sir John Monteith, a renegade Scottish baron, who then held the castle of Dumbarton for the English, was the person by whom Wallace was betrayed into the hands of the English; and it is certain that for this service he received from the English privy council a grant of land of the annual value of 100*l*. Having discovered the patriot's retreat through the treacherous information of Jack Short, his servant, he seized him under cover of night at Robroyston, a place about three miles from Glasgow, conveyed him instantly to Dumbarton castle, and thence with all speed to London. He was hastily tried, and condemned to death. On the 23rd of August, 1305, this noble hero, heavily ironed, was dragged at the tails of horses through the streets to the usual place of execution, the Elms in Smithfield, and put to death with the most barbarous and inhuman tortures. He submitted to his atrocious sentence with unflinching courage. On reaching the place of execution, he requested that a psalter which had been taken from his person might be returned. The desire being complied with, he asked a priest to hold it open before him, and continued to gaze on it till consciousness failed. His head was then struck off, and his body divided into four quarters. The head was afterwards placed on London bridge, and the limbs were exposed at Newcastle, Berwick, Perth, and Stirling.

WALLACE, WILLIAM VINCENT, an eminent British musician, was born at Waterford, of Scotch parents, June 1, 1814. In his youth he manifested a strong musical bias, and played with skill on the piano and violin at a very early age. He obtained an engagement as leader of the orchestra at the Theatre Royal, Dublin, and filled it with much success; then visited Australia, New Zealand, India, and the United States, giving concerts in the principal towns, and appearing both as composer and performer. He first became known to the English public by his beautiful romantic opera of 'Maritana,' which was produced at the Drury Lane Theatre in 1845, and immediately acquired an extensive popularity. It is still a great favourite with musicians and the multitude, and its airs have passed into our popular musical vocabulary. 'Matilda of Hungary,' produced in 1847, was less successful, owing to its cumbrous libretto. Wallace now repaired to Germany, where he studied diligently, and paid a visit to the United States. On his return to London he composed his picturesque opera of 'Lurline,' brought out at Covent Garden in 1860, which may justly be characterized as a well of melody undefiled. His rich musical fancy was scarcely less conspicuous in 'The Amber Witch,' 1861; 'Love's Triumph,' 1862; and 'The Desert Flower,' 1863; while his fertile invention and delicate appreciation are plainly seen in the numerous chamber pieces and vocal compositions which constantly flowed from his untiring pen. After a long illness this able and prolific composer died at the Château de Bagur, in the south of France, on the 12th of October, 1865.

WALLACHIA. [MOLDAVIA AND WALLACHIA.]

WALLENSTEIN. *Albrecht Wenzel Eusebius, Duke of Mecklenburg, Friedland, and Sagan, Count of Waldstein*, commonly called *Wallenstein*, was the third son of Wilhelm baron von Waldstein. He was born in his father's castle of Hermanic, in Bohemia, September 15, 1583. He lost his mother in 1593, and his father in 1595, and although a younger son, he inherited considerable estates. His family belonged to the established Protestant church of Bohemia; but Albrecht's uncle and guardian was a Roman Catholic, and placed his ward under the Jesuits at Olmütz, who speedily converted him. He continued his studies at Pavia and Bologna, where he acquired a knowledge of the ancient and of many European languages; of law; of mathematics and other sciences connected with the military art; and a taste for astrology, in which he always believed, so that in later years the astrologer Seni was one of his principal councillors.

Anxious to signalize himself by military deeds, Wallenstein went to Hungary, and served in the imperial army against the Turks. After the peace of Sitvatorok, in 1606, he returned to Bohemia, and married an aged but wealthy widow, who died in 1614, and left him large estates in Moravia. In 1617 he raised a body of 200 dragoons, with whom he assisted the Archduke Ferdinand of Austria, then at war with the Venetians. In a short time he saw himself at the head of several thousand men, and, after the successful conclusion of the campaign, towards the end of 1617, the Emperor Matthias made him his chamberlain and colonel in his armies, and created him Count. Immediately afterwards he married the daughter of Count Harrach, and the emperor on this occasion conferred upon him the dignity of a count of the Holy Roman Empire. The states of Moravia appointed him commander of the Moravian militia; but on his refusal to join the Bohemians against the emperor, they deprived him of his command, and confiscated his estates. Wallenstein was now appointed quartermaster-general of the imperial army, and in the course of the following campaign, by his timely relief of Boucquoi, who was attacked by counts Mansfeld and Thurn near Teyn (June 10, 1619), saved the emperor from being made a captive in his own capital. It seems that, the resources of the emperor being exhausted, the count gave large sums for the support of his master. After the overthrow of King Frederick of Bohemia, the estates of his adherents were confiscated, and Wallenstein's reward was the lordship of Friedland, and other property of immense value.

Wallenstein was neither intoxicated by his triumph nor by his wealth. In 1621 he took the field against Bethlem Gabor, the prince of Transylvania, and forced him to sue for peace, which was granted on condition that he should give up his claim to the crown of Hungary. During the two ensuing years he was principally occupied with the management of his estates. But Bethlem Gabor having again taken up arms against the emperor, Wallenstein hastened to Hungary, and arrived just in time to save the imperial army, which was besieged in the camp at Goding, on the frontiers of Moravia. As a reward for this victory, the emperor, towards the close of 1623, conferred upon him the title of prince, and in the following year, 1624, created him Duke of Friedland and Prince of the Holy Roman Empire.

On the declaration of war of the Union of Lower Saxony, headed by Christian IV., king of Denmark, which threw the emperor into great embarrassment, the duke raised at his own expense 28,000 men, with whom he marched towards the Lower Elbe. The renown of his military skill, his wealth, and his liberality, was so great, that men flocked to his camp from all parts of Europe, whom the iron hand of their commander kneaded into a well-united mass. The glorious results of this campaign for the imperialists belong to the history of the Thirty Years' War. The campaign was begun and finished in 1626. Wallenstein lost 20,000 men by disease and fatigue, but in the beginning of 1627 he was again at the head of a force of 50,000. On August 1, 1627, he was at Troppau. On the 30th he captured Dömitz in Mecklenburg, after a rapid march of 250 miles.

The Danish war was concluded by the peace of Lübeck (May 13, 1629). Wallenstein's reward was the duchies of Mecklenburg. He chose Wismar for his residence, and obtained from the emperor the title of admiral of the Baltic and the Oceanic Sea (the German Sea). His plan was to form a navy with the assistance of the Hanseatic towns, and to prevent Gustavus Adolphus, the king of Sweden, from bringing his powerful aid to the Protestant cause.

No sooner was Wallenstein invested with Mecklenburg, than his numerous secret enemies changed their calumnies and intrigues into open accusations. Maximilian, duke of Bavaria, and Tilly, were among the most powerful. Maximilian at length declared to the emperor that he and all Germany would be ruined if the 'dictator imperii' remained longer at the head of the imperial armies. Ferdinand, after long hesitation, dismissed Wallenstein from his command in 1630, at the very moment when Gustavus Adolphus left the coast of Sweden for the invasion of Germany. The duke then retired to Bohemia, and resided alternately at Prague and at Gitschin, where he lived with such splendour as to excite the jealousy of the emperor himself.

The invasion of Gustavus Adolphus, the defeat of the imperial armies at Leipzig, the conquest of Bavaria by the Swedes, and the death of Tilly, need not here be related. [GUSTAVUS II; TILLY.] The empire was on the brink of ruin, and there was only one man who could save it. This man was Wallenstein. When he at last yielded to the supplications of the emperor to resume the command, he showed that he felt all his importance. Among his other conditions he demanded that he should have the sovereignty of the provinces that he might conquer; and that the emperor should give him as reward one of his hereditary states (Bohemia?), of which he should be the sovereign, though as an imperial vassal.

The campaign of Wallenstein against Gustavus Adolphus is described under THIRTY YEARS' WAR. After losing the battle of Lützen, he punished with death many generals, colonels, and inferior officers whom he considered to have failed in their duties in the engagement. He soon repaired his losses, and his arms were victorious in Saxony and Silesia. But his haughtiness became insupportable, and he openly manifested his design to make himself a powerful member of the empire. His old enemies, among whom was the duke of Bavaria, now conspired against him. They represented him as designing to overthrow Ferdinand's power in Germany, and the emperor was the more ready to believe the accusation, as it became known that France had offered to aid Wallenstein in obtaining the crown of Bohemia. The emperor ordered him to withdraw from Bohemia and Moravia, and to take up his winter-quarters in Lower Saxony (December, 1633); but his too powerful general neither would nor could obey this order, which he regarded as a violation of the conditions on which he had resumed the command. Finding, however, that the emperor was resolved to dismiss him, he prepared to resign his offices. His faithful lieutenants urged him not to abandon them, and in order to prove their invariable attachment, they signed a declaration at Pilsen, January 12, 1634, in which they promised to stay with Wallenstein as long as he would be their commander. This is the famous declaration which has always been represented as a plot against the emperor. Piccolomini, Gallas, and several other Italian and Spanish officers, availed themselves of the occasion to ruin the duke, and induced the emperor to sign an order by which he was deprived of his command and declared a rebel. Piccolomini and Gallas were commissioned to take him dead or alive. He ultimately took refuge in the castle of Eger, whence he tried in vain to negotiate with his enemies. It was to the treachery of some of his own officers, who had been bribed by the emperor, that he finally fell a victim. On February 25, 1634, the commandant of Eger gave a splendid entertainment to Wallenstein's officers, at which the duke was not present on account of his ill health. After dinner an armed band rushed into the room, and the friends of Wallenstein fell beneath their swords. Captain Devereux, at the head of thirty Irishmen, then rushed into the apartment of the duke, who received his death calmly from the hands of their leader, as he stood defenceless, and in his night dress. (Lieutenant-colonel Mitchell's *Life of Wallenstein*; Schiller, *History of the Thirty Years' War*; Adams, *Scenes from European History*; Archbishop Trench, *Two Lectures on the Thirty Years' War*; and Gustaf Freytag).

WALLER, EDMUND, was born March 3, 1605, at Coleshill, in the county of Hertford. His father was Robert Waller, Esq., of Amersham, in Buckinghamshire. Through his mother he was first cousin to Hampden, the patriot, and was therefore related to Cromwell. Edmund was still in his boyhood when his father died, leaving him an estate of 3500*l.* a year.

He was educated at Eton, whence he proceeded to King's College, Cambridge. When he first sat in Parliament is doubtful; but it is certain that he represented Amersham in Charles' third Parliament, which sat from March, 1627, to March, 1628, and also both in the short Parliament of April, 1640, and in the Long Parliament, which assembled in November of the same year.

The earliest of his poems is commonly assumed to have been produced towards the end of 1623, when the event happened which it celebrates, the escape of the Prince (afterwards Charles I.) from being shipwrecked. Yet it certainly was not published till some years later; and it seems most likely that it was not composed at the time of the escape.

Waller had meantime married; but his wife dying, he seems to have amused himself by making love to more than one high-born lady. Among those for whom he professed a passion were the Lady Dorothea Sydney, eldest daughter of the earl of Leicester, and the Lady Sophia Murray, who are celebrated respectively in his verses as Sacharissa and Amoret. He was unsuccessful, however, in both suits, and soon after married a lady of less exalted rank, who brought him thirteen children.

When government by parliaments was resumed, after an interruption of twelve years, in 1640, and Waller found himself again in the House of Commons, he joined the party in opposition to the court. On approach of the crisis, however, he seceded from his party. When the king set up his standard at Nottingham in August, 1642, Waller sent him a thousand broad pieces. He soon afterwards returned to his place in Parliament, and spoke openly on the royal side. He was one of the commissioners sent by the Parliament to the king at Oxford, after the battle of Edgehill, January, 1643, and it was soon afterwards, in the end of May, that the design known as Waller's Plot was discovered. It is difficult to say what was really the object of this so-called conspiracy; but it is certain that, through the poet's own confessions, several persons were hanged and imprisoned. As for Waller, undoubtedly the prime contriver of the design, whatever it amounted to, his life was saved, owing partly to his abject servility, partly perhaps to his wit and dexterity; but the facts connected with his deliverance are variously related. He lay in prison a year, and was then set at liberty on an understanding that he should leave the country. Of his property all that was exacted from him was a fine of 10,000*l.*; but it is said that he expended three times that sum in bribes.

On his release he retired to France, and took up his residence first at Rohan, afterwards in Paris, where, we are told, he lived in great splendour. It was during his exile that, in 1645, he published in 8vo the first collection of his poetry. At last, apparently about 1653, he obtained Cromwell's permission to return to England: and came over and established himself at Hall-Barn, near Beaconsfield. Although his mother continued a professed royalist, Waller soon insinuated himself into favour with Cromwell, to whom in 1654 he addressed 'A Panegyric to my Lord Protector, of the present greatness and joint interest of his Highness and this Nation.' In a similar strain he afterwards took occasion, in celebrating Blake's victory over the Spanish fleet, in September, 1656, to recommend to Cromwell the assumption of the name, as well as the power of a king.

The next of his poems is still in the same vein, 'On the Death of the Lord Protector;' but this is immediately followed in the collection by one 'To the King upon his Majesty's Happy Return.' The Restoration, however, restored Waller to his former position more completely than his recall by Cromwell had done. He now became once more a first figure both at court and in the state. It does not appear that he sat in what is called the Convention Parliament, which brought the king back; but to the next, or Charles' Long Parliament, which met in March, 1661, and continued till 1679, he was returned for Hastings; in the next, which met in March, 1679, he sat for Chipping-Wycombe. To the Parliament of James II., which met in May, 1685, the octogenarian poet was returned as one of the members for Saltash.

One of Waller's latest poetical performances was a copy of verses entitled 'A Presage of the Ruin of the Turkish Empire,' which he presented to James II. He did not live to witness the Revolution. He died at Beaconsfield, October 21, 1687. It is noted that his heir joined the prince of Orange.

WALLINGFORD, a market town and municipal and parliamentary borough, in Berkshire, is 51 miles E. by N. from London by the road, or about 50 by the Great Western Railway, which passes the town at about 2 miles distance. Wallingford is an ancient place, the earthworks with which the Romans encompassed it being still visible. It was called *Wealingford* by the Saxons. A castle was erected here at the time of the Conquest, but it was razed during the Civil War, and only a few remnants of its walls now remain. The town stands amidst fertile meadows, at the point of intersection of a Roman way with the Thames, which is here traversed by a stone bridge 300 yards long. Wallingford consists of several streets, and has a very neat appearance, although some of the houses are old fashioned. It contains three churches, one of them partly Norman, four or five places of worship for dissenters, a spacious market-place, a town-hall, market-house, and gaol. The municipal borough is governed by four aldermen and twelve councillors, and had in 1861 a population of 2793. The parliamentary borough, which returns one member, includes several adjoining parishes, and had in 1861 a population of 7794. The number of electors in 1867 was 357. The population has only increased by fourteen since 1841; in fact, Wallingford is almost stationary as regards the number of its inhabitants and its trade, the latter being purely agricultural.

WALLIS, JOHN, was the eldest son of the Rev. John Wallis, incumbent of Ashford in Kent, where he was born November 23, 1616.

He was fifteen years old when his curiosity was excited by seeing a book of arithmetic in the hands of his younger brother, who was preparing for trade; his brother went through the rules with him, and in a fortnight he had mastered the whole. He was entered at Emanuel College in Cambridge, where he soon obtained reputation. After taking the degree of master of arts, he was chosen fellow of Queen's, and took orders in 1640. He was then chaplain in one and another private family, residing partly in London, till the breaking out of the Civil War, in which he took the side of the Parliament. He made himself useful to his party by deciphering intercepted letters, an art in which he was eminent. In 1645 he was among the first to join those meetings which afterwards gave rise to the Royal Society. When the Independents began to prevail, Wallis joined with others of the clergy in opposing them; and in 1648 subscribed a remonstrance against the execution of Charles I. In 1649 he was appointed Savilian professor of geometry at Oxford by the parliamentary visitors. He now removed to Oxford, and applied himself diligently to mathematics. At the end of 1650 he first met with the method of indivisibles, in the writings of Torricelli, and from this time his celebrated researches began.

In 1658 Wallis, who with others desired the restoration of the kingly power, employed his art of deciphering on the side of the Royalists; so that at the Restoration he was received with favour by Charles II., confirmed in his professorship and in the place of keeper of the archives at Oxford, and was made one of the royal chaplains. In 1661 he was one of the clergy appointed to review the Book of Common Prayer. He was of course one of the first members of the Royal Society, and from this to his death his life is little more than the lists of his works. In 1692 he was consulted upon the adoption of the Gregorian calendar, or new style, against which he gave a strong opinion, and the design was abandoned. In 1696, when the first two volumes of his works appeared, he was the remote occasion of the controversy between the followers of Newton and Leibnitz. Some remarks were made on his assertions as to the origin of the differential calculus in the Leipzig Acts, which produced a correspondence, and this correspondence was published in the third volume. He died October 28, 1703, in his eighty-eighth year.

As a mathematician he is the most immediate predecessor of Newton, both in the time at which he lived and the subjects on which he worked. Those who incline to the opinion that scientific discoveries are not the work of the man, but of the man and the hour, that is, who regard each particular conquest as the necessary consequence of the actual state of things, and as certain to come from one quarter or another when the time arrives, will probably say that if Wallis had not lived, Newton would but have filled his place, as far as the pure mathematics are concerned.

WALLIS' THEOREM, invented by the preceding, a well-known ingenious expression for the ratio π of the circumference to the diameter of a circle, as:—

$$\frac{\pi}{2} = \frac{2^2 : 4^2 : 6^2 : 8^2 : 10^2}{3^2 : 5^2 : 7^2 : 9^2 : 11^2}$$

WALLOON, or WALLON, the language of the ancient Gauls and Celts, peculiar to the early inhabitants of Hainault, Namur, Luxemburg, Artois, and part of Flanders and Brabant. The Romans having subdued several provinces in Gaul, established prætors, or proconsuls, &c., to administer justice in the Latin tongue. On this occasion, the natives applied themselves to learn the language of the conquerors, and thus introduced the Roman words and phrases into their own tongue. Of this mixture of Gaulish and Latin was formed a new language called *Romans*, in contradistinction to the ancient unadulterated Gaulish, which was called Walloon. This distinction is partly kept up to this day; for the inhabitants of several of the Low Country provinces say that in France they speak *Romans;* whereas *they* speak the Walloon, which comes much nearer the simplicity of the ancient Gaulish.

WALLSEND, a parish of England, in the county of Northumberland, is situated 4 miles E.N.E. of Newcastle, and is intersected by the Newcastle and Shields Railway. The village is large and well built; and the population of the parish in 1861 was 6715, who are principally employed in the neighbouring collieries. Wallsend coal is generally of a very superior quality. Upwards of 2,000,000 tons of it are annually imported into London,

where a higher price is always paid for it than for any other kind.

WALMER. [KENT.]

WALNEY ISLAND. [LANCASHIRE.]

WALNUT TREE, the common name of the species of *Juglans*, a genus of plants belonging to the natural order *Juglandaceæ*. There are four species, three of which are natives of North America and one of Asia. All are large trees.

The Royal or common Walnut Tree (*Juglans regia*) is the oldest and the best known of the species. There is no history of its introduction into Great Britain, but it is now very commonly cultivated in this country, although it fails to propagate itself by its seeds. It is only, however, in the southern and middle parts of England that it brings its fruit to perfection.

Its uses are various. Before the introduction of mahogany and other foreign woods, its wood was held in higher estimation than that of any other European tree.

In almost every stage of its growth the fruit is used. When young, green, and tender, walnuts are pickled and preserved with the husks on. About the end of June they may be preserved with or without their husks. When they are fully ripe, which is generally at the end of September or the beginning of October, the kernel, deprived of its investing skin, is eaten in great quantities. As long as the skin can be easily removed, they are a nutritious and healthy article of diet; but when they get dry, so that their skin sticks to them, they become indigestible.

The albumen which constitutes the bulk of the seed of the walnut contains an oil, which is used in large quantities, especially on the Continent. It is obtained by reducing the seeds to a pulp by means of a stone wheel and basin, and then expressing the oil, first without heat, and then by the application of heat. The oil obtained by heat is used by artists, and also for lamps.

All parts of the walnut tree, excepting the albumen of the seed, possess a bitter principle, which acts as a tonic and anthelmintic, and was formerly much esteemed as a medicine.

The Black Walnut Tree (*Juglans nigra*) is a North American species, and found in all parts of the United States, as far as 40° 50′ N. lat. It is one of the first trees that was introduced from America to Europe, having been brought to England by the younger Tradescant in 1656. It is a rapid-growing tree, and attains a height of 50 or 60 feet in about forty years. It bears fruit in this country, which is very much inferior to that of the European walnut.

The Gray Walnut or Butter-nut Tree (*Juglans cinerea*) is from North America. It is found in Upper and Lower Canada, and in the temperate regions of the United States. This tree attains in its native regions a height of about 50 or 60 feet. The kernel of the nut affords a thick oil which soon becomes rancid, and hence probably the names of butter-nut and oil-nut.

The imports of walnut wood into the United Kingdom in 1866 amounted to 6032 tons, value 43,308*l*. The largest quantities were received from Italy, the United States, and Austria.

WALPOLE, HORACE, Earl of Orford, the third and youngest son of Sir Robert Walpole, was born October 5, 1717. When he had finished his education at Eton, and at King's College, Cambridge, he left England, and travelled for more than two years. On his return home in September, 1741, he took his seat in the House of Commons as member for Callington. He did not take any prominent part in the debates, and when the interest excited by his father's affairs had subsided, rarely addressed the House. He moved the address in 1751, and spoke in 1756 on the question of employing Swiss regiments in the colonies. In 1757 he exerted himself with much ardour in favour of Admiral Byng. These are the chief events of his public life, although he remained in Parliament till 1768.

His principal occupation for many years of his life was the building and decoration of his Gothic villa at Strawberry Hill, Twickenham. He collected works of art and curiosities of every description to ornament his house and gratify his tastes—prints, pictures, miniatures, armour, books, and manuscripts. He was enabled to indulge in these expensive pursuits by the profits of three sinecure offices which his father had obtained for him, viz., usher of the exchequer, comptroller of the pipe, and clerk of the estreats.

To the tastes of a virtuoso he added those of a man of letters. His earliest compositions were in verse; they are not imaginative, and evince but little aptness for versification. In 1752 he published his 'Ædes Walpolianæ,' and in 1758 his 'Catalogue of Royal and Noble Authors.' In 1761 he commenced the publication of 'Anecdotes of Painting in England,' which was not completed until 1771; and in 1763 he added a 'Catalogue of Engravers.'

Walpole's celebrated novel, the 'Castle of Otranto,' appeared in 1764, as a translation, by William Marshall, from the Italian of Onuphrio Muralto, which the author intended as an anagram of his own name. Four years later was published his tragedy of 'The Mysterious Mother.' His next work was the 'Historic Doubts on the Life and Reign of King Richard III.' He was besides continually publishing minor compositions, such as papers in the *World* and other periodicals, his 'Essay on Modern Gardening,' the 'Hieroglyphic Tales,' and 'Reminiscences of the Courts of George I. and II.' He also prepared 'Memoirs' of the last ten years of the reign of George II., which were not published until after his death. But the cleverest and certainly the most entertaining of all his writings are his letters, addressed to various friends, collected by himself, and published at different times since his death. An edition was published in 1840, in six volumes, 8vo; and a much more complete edition by Peter Cunningham, in nine volumes, some twenty years later. This series comprises a period of more than sixty years, from 1735 to 1797.

In 1791 Walpole succeeded his nephew George, third earl of Orford, in the title and estates of his family. He died at his house in Berkeley Square, London, March 2, 1797.

WALPOLE, SIR ROBERT, Earl of Orford, the third son of Robert Walpole, Esq., M.P. for Castle Rising, was born at Houghton, August 26, 1676. He was educated at a private school at Massingham, and afterwards on the foundation at Eton, and at King's College, Cambridge. His father died November 28, 1700, and left him the family estate. He immediately entered Parliament as a member for Castle Rising; and joined the Whigs in promoting the Protestant succession. He attracted the attention of the leaders of the party; and in March, 1705, was appointed one of the council to Prince George of Denmark, then lord high admiral. Henceforward he assumed a high position in Parliament; and in 1708, on his promotion to the office of secretary-at-war, the management of the House of Commons was intrusted to him by his party. In 1710 he was appointed one of the managers for the impeachment of Sacheverel. The Whig administration being shortly afterwards broken

up, Harley vainly endeavoured to persuade Walpole to accept a place in the new cabinet, and declared him to be worth half his party. When the ex-ministers were charged with corruption and inaccuracy in the public accounts, their defence was ably conducted by Walpole; but he was punished for his zeal by a similar accusation directed against himself personally. On January 17, 1712, a majority of the House resolved that while secretary-at-war he had been 'guilty of a high breach of trust and notorious corruption,' and he was accordingly committed to the Tower and expelled the House of Commons. His popularity, however, remained undiminished, and he did more for his vindication with his pen while in prison, than he could have done in the face of his enemies, who had already condemned him. He remained a prisoner until the prorogation of Parliament, and at the dissolution in August, 1713, again entered the House of Commons as member for Lynn.

On the accession of George I. Walpole, with his brother-in-law Viscount Townshend, had a principal share in the formation of the Whig administration. He was himself appointed paymaster-general of the forces and of Chelsea Hospital. He took a leading part in the prosecution of the various leaders of the Tory party for intriguing in favour of the Pretender; and when the rebellion broke out, was appointed first lord of the Treasury and chancellor of the Exchequer. The fatigue and anxiety of that alarming crisis brought on a severe illness. Before his recovery the memorable Septennial Bill, which had been prepared with his concurrence, was passed. Disunion in the cabinet and the constant intrigues of the Hanoverian courtiers and the king's mistresses broke up this administration; and in April, 1717, Walpole delivered up his seals to the king. He now distinguished himself by the ability and practical knowledge with which he opposed the measures of the new government.

In June, 1720, he consented to take office, and was appointed paymaster-general of the forces, and subsequently first lord of the treasury on the resignation of Lord Sunderland in April, 1721. He had meantime acquired great reputation by the means which he had adopted to restore public credit after the South Sea panic (the failure of which scheme he had predicted), and the firmness and moderation which he displayed in punishing the offenders.

Having settled for a time the financial affairs of the country, Walpole turned his attention to commerce, and removed various heavy taxes and restrictions upon the imports and exports of many of the most important articles. In June, 1723, the king created his son a peer. Walpole had declined this honour himself, from the fear of losing his influence over the House of Commons. In 1724 he was created a Knight of the Bath, and in 1726 was installed a Knight of the Garter.

To follow Sir Robert Walpole through the events of his long administration would require little less than a history of his times. There were no important debates in Parliament, no deliberations in the cabinet, no negotiations with foreign states, in which he did not bear the most conspicuous part as the first statesman of his day.

In 1737 his influence was much shaken, first by the quarrel between the king and the prince of Wales, and the hostility of the latter to the king's government, and especially to Walpole, who had been chiefly consulted by the king; and, secondly, by the death of Queen Caroline, who had always been one of his strongest friends and supporters.

Walpole was soon in the midst of great embarrassments. The king, the people, a strong minority in the Commons, a majority in the Lords, and a preponderance in the cabinet, were eager for war with Spain. Walpole endeavoured to avert it as a national calamity, but was overpowered by the union of so many parties in its favour, nor was his resignation accepted by the king when tendered. Discord ensued in the cabinet, and the opposition in Parliament became more strenuous than ever. In February, 1740, a motion was made by Sandys, for an address to the crown for the removal of Sir Robert Walpole 'from his Majesty's presence and counsels for ever.' No distinct charges were made against the minister; but every complaint against the measures of his government, foreign or domestic, during the last twenty years, was urged as a reason for his dismissal. Walpole defended himself with boldness and dignity, and the motion was negatived by a large majority in both houses. But, notwithstanding this triumph, his power was nearly exhausted. A dissolution followed. After several close divisions in the next Parliament, he was left, February, 2, 1742, in a minority of sixteen on an election case. On the 9th he was created Earl of Orford by the king, and on the 11th he resigned.

No sooner was a new administration formed under Pulteney than an attack was made upon the ex-minister. A secret committee appointed by the House of Commons made a report, in which they charged Walpole—1, with having used undue influence at elections; 2, with grants of fraudulent contracts; and, 3, with peculation and profusion in the expenditure of the secret service money. These charges were but ill supported, and the report must be regarded, if not as a verdict of acquittal, at least as one of *not proven*. A motion for renewing the inquiry was repeated in the following session, but defeated by a large majority. From this time Walpole took very little part in public affairs. He was frequently consulted by the king, and retained much political influence, but rarely spoke in the House of Lords. After dreadful suffering from the stone, he died, March 18, 1745.

WALPURGIS NIGHT, the night of the festival of St. Walpurga, or Walburga, niece of Boniface, the apostle of Germany, and abbess of the convent of Herdinheim, founded by her brother, St. Wunnibald, where she died in 778. Her feast-day is properly the 25th of February, but being assigned in some German calendars to the 1st of May, it has accidentally become associated with a popular superstition. Walpurgis Night is, therefore, the eve of St. Walpurga's day, and the occasion on which the witches repair to their annual festival, held on the summit of the Brocken, the highest point of the Harz, under the direct superintendence of their master, the devil. The Witches' Sabbath, as it is sometimes called, has been described with ghastly force of imagination in the second part of Goethe's 'Faust.' (See Mr. Theodore Martin's, or Mr. A. Hayward's translations; the latter contains some interesting notes.)

WALRUS. [SEALS.]

WALSALL. [STAFFORDSHIRE.]

WALSINGHAM, or WALSYNGHAM, SIR FRANCIS, was descended from an ancient family, and born at Chiselhurst in Kent, 1536. After studying at King's College, Cambridge, he went to travel on the Continent; and remained abroad till after the accession of Elizabeth. On his return to England his accomplishments recommended him to the notice of Cecil, under whom he was soon introduced to high and confidential employment in the public service. He was sent twice to Paris, and on his return from his second mission was appointed one of the principal secretaries of state and

sworn of the privy council; and soon after was knighted. In 1578 he was sent as ambassador to the Netherlands; in 1581 again to France; and in 1583 to Scotland. In October, 1586, he served as one of the commissioners at the trial of Mary Queen of Scots. He was next appointed chancellor of the duchy of Lancaster. His system of policy was founded upon and maintained by bribery, espionage, and all the forms of deception; but he was notwithstanding the very reverse of a man of mere expediency. His personal integrity and disinterestedness are unquestionable; his morality was strict, to the verge of asceticism; his religious zeal drew him all his life towards puritanism. He died April 6, 1590, having for some time previously lived in retirement.

WALTER, JOHN, proprietor of the *Times* newspaper, was the son of Mr. J. Walter, printer to the Board of Customs, and born in 1774. He was the first journalist who succeeded in imparting to the daily press 'its vast range and celerity of information, its authentic accuracy, its universal correspondence, its lucid arrangement, and marvellous despatch, and, more than all, its dignity in the social scale, and its political position as what has been called the fourth estate of the realm.'

Mr. Walter was the first newspaper proprietor who brought the steam-engine to the assistance of the press. He had many difficulties to encounter, but his indomitable perseverance eventually overcame them all. In 1814 the ingenious engineer Kœnig, a native of Saxony, and inventor of the steam printing press, was introduced to him. Mr. Walter entered into his projects with enthusiasm, and determined to introduce his printing machine into the *Times*' establishment. But, independently of the mechanical difficulties he had to encounter, the most savage and uncompromising opposition existed on the part of his workmen. Yet he overcame every obstacle; and printing by steam, on a gigantic scale, was at length brought into successful operation. This may be considered as one of the greatest events in the mechanical history of printing. [PRINTING.] The success attending the *Times*, chiefly owing to the vast mechanical power it had thus obtained, soon raised it above all rivalry. It received the designation of 'the leading journal of Europe,' and its profits from advertisements and its extensive circulation became enormous. Its proprietor was enriched accordingly; and after having purchased the fine estate of Bearwood, in Berkshire, he came forward as the representative for the county. He was elected in 1832, and rechosen without opposition in 1835. In 1841 he was returned for Nottingham; but at the general election which followed he was defeated, and never again entered Parliament. He died at Bearwood in 1847. [KŒNIG.]

WALTHAM ABBEY. [ESSEX.]

WALTHAM, BISHOP'S. [HAMPSHIRE.]

WALTHERIA, a genus of plants belonging to the natural order *Sterculiaceæ*. *W. Americana* is a shrub about 4 feet in height, with yellow flowers. It is a native of the Bahama Islands, of Surinam, and the Caribbee Islands. *W. Durandinha* is a native of Brazil on the banks of the river Uruguay. This plant, like the whole of the order to which it belongs, contains much mucilaginous matter, and is used in decoction in the Brazils.

WALTON, IZAAK, the well-known author of 'The Complete Angler,' and patron saint of the piscatorial art, was born at Stafford in 1593, and on the 9th of August. Nothing certain is known of his early life, but in 1624 we find him established in Fleet Street, London, as a hosier, having previously removed from a small tenement in the Royal Exchange. The lover of angling will be glad to know that the Fleet Street shop was situated on the north side, 'two doors west of the end of Chancery Lane,' and consequently in the very heart of city turmoil; a very inappropriate locality, surely, for one who all his life 'babbled of green fields.' At a later period he obtained a little more quiet, settling himself in the seventh house on the west side of Chancery Lane.

Sometime in 1626 Walton wedded Rachel Floud, a descendant on the mother's side from Archbishop Cranmer, and by her he had seven children, none of whom grew out of childhood. Their mother followed them to the grave in 1640. Three years later, having acquired a moderate competency, Walton retired from business, and thenceforth wholly abandoned himself to those literary and piscatorial pursuits in which his soul delighted. He had already made frequent fishing excursions, with congenial companions, to the little river Lea, whose waters now offer but few temptations to the angler; and had adventured into print as early as 1640, with a 'Life of Dr. John Donne,' the poet and divine, of whom he had been the friend, the disciple, and the admirer.

In 1646 he married a second time, choosing for his wife Anne Ken, the virtuous sister of Bishop Ken. She brought him two sons (of whom only one named Izaak lived), and a daughter, Anne, and closed a brief but happy wedded life in 1662.

Walton himself, endowed with a robust constitution and a cheerful temperament, reached a green old age. In his eighty-third year he was so hale and hearty that he could undertake a pilgrimage of upwards of 100 miles to visit his friend Cotton, on the Dove, in Derbyshire. His regular habits and daily exercise undoubtedly contributed to preserve for him that highest of earthly blessings, the 'mens sana in corpore sano,' and he would seem at last to have been killed prematurely by the severe winter of 1683, when the Thames was covered with ice 11 inches thick, and nearly all the birds perished. He was then in his ninety-first year, and on a visit to his daughter Anne at Winchester, where, in the stately cathedral, he lies buried.

The work by which he is chiefly known is 'The Complete Angler, or Contemplative Man's Recreation,' which was first published in 1653, and passed through five editions in its author's lifetime. Its popularity has been preserved undiminished up to the present time, when it is read and loved, not certainly on account of its precepts and practical directions, which are now obsolete, but for its charming style, its vivid sketches of nature, its genial wisdom, and devout piety.

Not inferior in literary merit are Walton's biographies, his 'Lives of Donne, Hooker, Sir Henry Wotton, George Herbert, and Dr. Sanderson,' which successively appeared in 1640, 1651, 1662, 1670, and 1678. Though brief they are full; though serious, never dull. Each memoir is a perfect gem, perfect in itself and in its setting. The style is grave and eloquent; the discrimination of character acute and delicate; there are sage remarks and tender sympathies illuminating every page with a soft subdued light; and yet so modestly is the work wrought that the reader never thinks of the biographer's skill until he has laid down his book. They are worthy in every sense of the fine sonnet in which Wordsworth has celebrated them, and in which he refers to the five holy men thus immortalized by Walton's affectionate genius, as

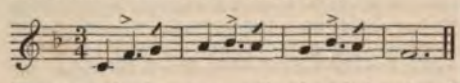
> 'Satellites burning in a lucid ring,
> Around meek Walton's heavenly memory.'

They have been frequently reprinted, but we wonder

no modern publisher has dedicated to them an *edition de luxe*.

WALTON-ON-THAMES. [SURREY.]

WALTZ (Ger. *Wälzer*, *i.e.*, 'a roller'), the name of the German national dance, and also of the characteristic music, in triple time, by which it is accompanied; its native home appears to be Bohemia. It was introduced into England by Baron Neumann and others, about 1813; not without much opposition on the ground of its alleged indelicacy. It provoked a satire from the pen of Byron, entitled 'The Waltz, an Apostrophic Hymn,' but the satire was wholly unworthy of the poet's genius. Of late years a modification of the waltz has been introduced, entitled the *Valse à deux Temps*. The music is still played in triple time, but in every bar the accent falls on the second crotchet: thus,



The new waltz is very generally adopted, but though more spirited is less graceful than the original.

WAMPEE, a Chinese appellation for the fruits of the *Cookia punctata*, which form a favourite article of food, not only in China, but in the islands of the great Eastern Archipelago.

WAMPUM, an American Indian name for the shells which they formerly employed, and still use to a limited extent, as a commercial medium and a kind of currency. The shells were strung together, and worn as a belt.

WANDEROO. [MACACUS.]

WANDSWORTH. [SURREY.]

WANTAGE. [BERKSHIRE.]

WAR. To explain the theory of war, and comment on the science of strategy, as now understood, would require a far greater amount of space than we have at our disposal. Moreover, the subject is too purely technical to interest any but a very limited class of readers. Those who wish to study its principles, or examine their application, would scarcely turn to the pages of a Cyclopædia; they would address themselves to the elaborate treatises and manuals published by well-known authorities, and to the historical records of great campaigns and the memoirs of great captains, which abound in English, French, and German literature. We are, therefore, of opinion that we shall best consult the convenience of the general reader by appending a carefully prepared chronological summary of the more important wars in which England has been engaged since the epoch of the Norman conquest. It will be useful for purposes of reference, while showing how seldom, in eight centuries, the temple of Janus has been shut in the British empire.

With Scotland, 1138–39.—Battle of Northallerton, or the Standard, 1138.
With France, 1161–86, 1194–95, 1201–16, 1224–34, 1294–99.
With Scotland, 1296–1323.—Battles of Falkirk, 1298; of Bannockburn, 1314.
With Scotland, 1327–28.
With Scotland, 1333–46.—Battles of Halidon Hill, 1333; of Neville's Cross, 1346.
With France, 1339–60.—Battles of Sluys, 1340; of Crecy, 1346; of Poictiers, 1356.
With France, 1368–1420.—Battles of Agincour, 1415; of Harfleur, 1416.
With France, 1422–71.—Battles of Crevant, 1423; of Verneuil, 1424; of Herrings, 1429; of Patay, 1429.
With France, 1472–92, 1512–14.
With Scotland, 1512–15.—Battle of Flodden, 1515.
With France, 1512–27.—Battle of Guinegate (the Spurs), 1513.
With Scotland, 1522–46.—Battle of Solway, 1542.
With Scotland, 1547–50.—Battle of Pinkey, 1547.
With France, 1549–50.
With France, 1557–59.—Capture of Calais, 1558; Battle of Gravelines, 1558.
With Scotland, 1557–60.
With France, 1562–64.
With Spain, 1588–1604.—Defeat of the Armada, 1588.
With Spain, 1624–29.
With France, 1627–29.
With Holland, 1651–54.—Blake's naval victories, 1652.
With Algiers, 1654.
With Spain, 1655–60.—Attack upon Santa Cruz, 1657.
With Holland, 1665–68.—Battle off Harwich, 1665; at the mouth of the Thames, 1666.
With France, 1666–68.
With Denmark, 1666–68.
With Algiers, 1669–71.
With Holland, 1672–74.—Battle of Solebay, 1672.
With France, 1689–97.—Siege of Namur, 1692; Battle of Landen, 1693; Peace of Ryswick, September, 1697.
War of the Succession, 1702–13.—Battles of Blenheim, 1704; Ramillies, 1706; Oudenarde, 1708; and Malplaquet, 1709.
With Spain, 1718–21.
With Spain, 1739–48.—Victory at Dettingen, 1743; Battle of Fontenoy, 1745; Peace of Aix-la-Chapelle, 1748.
With France, 1744–48, 1756–63.
In India, 1746–49.—Against the French.
In India, 1748–65.—Capture of Arcot, 1751; Battle of Plassey, 1757; Conquest of Patna, 1763; Supremacy of the British, 1765.
The Seven Years' War.—England, the ally of Prussia, against Austria, France, and Spain; Capture of Quebec, 1759.
With Spain, 1762–63.—Peace of Paris, 1763.
In India, 1765–80.—Jurisdiction of Warren Hastings; Capture of Pondicherry, 1778; Capture of Arcot, 1780.
With United States of America, 1774–82.—Battles of Bunker's Hill, 1775; Brandywine, 1777; Saratoga, 1777.
With France, 1778–83.—Treaty of Paris, 1783.
With Spain, 1780–83.
With Holland, 1780–83.
In India, 1782–1809.—Defeat of Hyder Ali, 1782; Defeat of Tippoo Saib, 1791; Capture of Pondicherry, 1793; Government of Marquis Wellesley, 1798; Siege of Seringapatam, 1799; Mahratta Campaign, 1803; Battle of Assaye, 1803; Defeat of Scindiah, 1805; Mutiny at Vellore, 1806; Mutiny at Seringapatam quelled, 1809.
War of the French Revolution, 1793–1802.—Earl Howe's Victory, 1794; Cape St. Vincent, 1797; Camperdown, 1797; Peace of Amiens, March 27, 1802.
War against Imperial France, 1803–15.—Battle of Trafalgar, 1805; Bombardment of Copenhagen, 1807; Battles of Vimiera, 1808; Corunna, 1809; Talavera, 1809; Busaco, 1810; Fuentes d'Onoro, 1811; Salamanca, 1812; Vittoria, 1813; Pyrenees, 1813; St. Jean de Luz, 1813; Toulouse, 1814; Ligny, 1815; Quatre Bras, 1815; Waterloo, 1815.
With United States, 1812–14.—Capture of the Chesa-

peake, 1813; Capture of Washington, 1814; Catastrophe at New Orleans, 1815.
In India, 1814–35.—Pindaree Campaign, 1817–18; Burmese War, 1824; Opening of Trade with India, 1833.
With China, 1834–43.
With Afghanistan, 1838–42.—Battle of Ghiznee, 1839; Rising at Cabul, 1840; Disaster of the Khyber Pass, 1842; Cabul destroyed, 1842.
With Scinde, 1843.
With China, 1843–56.
With the Sikhs, 1845–1850.—Battle of Moodkee, 1845; of Aliwal, 1846; of Sobraon, 1846; Treaty of Lahore, 1846; Siege of Mooltan, 1848; Battle of Chillianwallah, 1849; of Goojerat, 1849; Government of Sir Charles Napier, 1849; British Successes, 1849–50.
With Burmah, 1851–53.
With Russia, 1854–56.—The Alma, 1854; Balaklava, 1854; Inkermann, 1854.
With China, 1856–60.—Destruction of Chinese Fleet, 1857; Capture of Canton, 1858; Cessation of War, 1859; War recommences, 1860; Capture of Pekin by Sir Hope Grant, 1860.
With Persia, 1856–57.
War of the Indian Mutiny, 1857–59.—Mutinies at Barrackpore and Meerut, 1857; at Lucknow, 1857; Suppression of Mutiny at Benares, 1857; Siege of Lucknow by rebels, 1857; Death of Sir H. Lawrence, 1857; Assault of Delhi, 1857; Rescue of Cawnpore, 1857; Capture of Lucknow by Sir C. Campbell, 1858; Victories of Sir Hugh Rose, 1858; Pacification of India, 1859.
With Abyssinia, 1867–68.

WARBLERS [SYLVIADÆ], a family of small slender-billed singing birds, included by Linnæus within his genus *Motacilla*.

They principally inhabit woods, thickets, orchards, and gardens, but some affect watery situations and reed-marshes. Many are remarkable for the melody of their song, and the sprightliness of the airs which in the period of incubation they incessantly pour forth.

As examples we may mention the NIGHTINGALE, the BLACK-CAP, the Redbreast, &c.

Living almost exclusively on the winged insects of summer, which they dexterously catch in the air, or pick from off the leaves, they migrate to the south in autumn, and pass their winter in warm or tropical regions. To this rule there are certain exceptions. The Redbreast, the Wren, the Golden-crested Wren, &c., are permanent residents in our island. These birds, in the latter part of autumn and during the winter, feed partly on berries and partly on the eggs and pupæ or larvæ of insects concealed in fissures of the bark of trees, or attached to the twigs of brushwood and thick hedgerows. Among the migratory species, the males, as a general rule, precede the arrival of the females to their summer breeding places.

Mr. Gould, in his 'Birds of Europe,' describes four species of Wheatear (*Saxicola*), of which one is a summer visitant to our island. The others are all continental. To these must be added the Whinchat and the Stonechat, both British. Of the Redstarts three species are given:—The Redstart (*Phœnicura ruticilla*), the Black Redstart (*Ph. tithys*), and the Blue-throated Warbler (*Ph. Suecica*). The latter two are rare in Britain. [BLUE-BREAST.] Of the Redbreast we have only one European species (*Erythaca rubecula*) familiar to all. Three species of *Accentor*, or Hedge-sparrow, are described. One is the common Hedge-sparrow (*Accentor modularis*); the others are continental, viz., the Alpine Accentor (*A. Alpinus*), and the Mountain Accentor (*A. montanellus*).

Of Locustelles (*Locustella*) we may enumerate the Reed Locustelle (*L. fluviatilis*), the Brake Locustelle (*L. avicula*), the Willow Locustelle (*L. luscinoides*), and the Creeping Locustelle (*L. certhiola*). Of these the Brake Locustelle regularly visits Great Britain. Of Salicarias Mr. Gould describes the Great Sedge-warbler (*Salicaria turdoides*), the Olive-tree Salicaria (*S. olivetorum*), the Red Wren (*S. arundinacea*), British; the Marsh-warbler (*S. palustris*); the Sedge-warbler (*S. phragmitis*), British; the Moustached Warbler (*S. melanopogon*), the Aquatic Warbler (*S. aquatica*), the Rufous Sedge-warbler (*S. galactoles*), the Fantail Warbler (*S. cisticola*), the Cetti Warbler (*S. cetti*), and the Silky Warbler (*S. sericea*).

Of the true nightingales Europe has two, the common Nightingale (*Philomela luscinia*), and the Thrush Nightingale (*Ph. turdoides*).

Of the genus *Calliope* one species, rare in Europe, is known, viz., the Gorget Warbler (*Calliope Lathami*).

Of the genus *Curruca*, we may enumerate the following:—The Orpheus Warbler (*C. Orphea*), the Black-cap (*C. atricapilla*), Rüppell's Warbler (*C. Rüpellii*), the Sardinia Warbler (*C. melanocephala*), the Subalpine Warbler (*C. leucopogon*), the common White-throat (*C. cinerea*), the lesser White-throat (*C. garrula*), the Spectacle Warbler (*C. conspicillata*), Marmora's Warbler (*C. sarda*), and the Barred Warbler (*C. nisoria*). The genus *Melizophilus* presents us with the Dartford Warbler (*M. provincialis*). This species is common in southern Europe; comparatively scarce in Germany; permanent in England, but not generally diffused. It is found in the neighbourhood of London, at Bagshot, Cobham, &c., and occurs in Devonshire, Cornwall, and Berkshire. Many of the species which we have enumerated are common to Asia as well as to Europe; but the Warblers generally are not abundant in that quarter of the globe. Most zoologists make Africa, and especially its northern regions, their winter quarters.

WARBURTON, WILLIAM, was born at Newark, December 24, 1698, and was the elder of the two sons of Mr. George Warburton, an attorney of that place. He lost his father when he was only eight years old. He received the usual grammar-school education; and on leaving school was placed in the office of an attorney, with whom he continued till April, 1719, when he set up in business for himself at Newark. But a love of study had early taken possession of him; his professional success, probably impeded by these tastes, is supposed not to have been considerable; and at length, having made up his mind to enter the church, he received deacon's orders from Dawes, archbishop of York, in 1723. He now published his first literary performance, a small volume of 'Miscellaneous Translations in Prose and Verse from Roman Poets, Orators, and Historians.' About the end of 1726 he formed his first literary connection, which was with Theobald, Concanen, and others, united by a common hostility to Pope, who had satirized them. He furnished some notes to Theobald's Shakspeare, which appeared in 1733. In 1728 he obtained the degree of master of arts at Cambridge, on the occasion of the king's visit; and in the same year his friend and patron, Sir Robert Sutton, presented him to the rectory of Burnt or Brant Broughton, near Newark. The first publication which made him generally known appeared in 1736, entitled 'The Alliance between Church

and State; or, the Necessity and Equity of an Established Religion and a Test Law demonstrated from the Essence and End of Civil Society, upon the Fundamental Principles of the Law of Nature and Nations.' The arguments of this treatise have been much approved by those, Bishop Horsley for example, who were already prepared to accept the conclusions. In 1738 appeared the first volume, containing the first three books of his great work, 'The Divine Legation of Moses,' &c. Its leading idea is, that so important a doctrine as that of a future state, which must be regarded as the chief natural cement and bond of human society, could not possibly have been dispensed with in any scheme of mere human legislation, and that hence the Mosaic dispensation, wherein, according to Warburton's views, it is omitted, must have come from heaven, and must also have been maintained in a peculiar manner by a divine or miraculous influence. This view at least was novel; and it was developed by its author with an ingenuity, a fullness and a variety of learning, and an unflagging animation, such as certainly never had been combined before in any English theological work. But mere theological discussion forms only a small portion of the book; the author is continually making excursions from his argument, and in this way the reader is conducted over some of the most interesting fields of literature and philosophy. The complete work consists of five volumes.

Six letters that Warburton published on 'The Works of the Learned,' in defence of the orthodoxy of Pope's 'Essay on Man,' introduced him to Pope, who was ever afterwards his zealous friend. The poet on his death, in 1744, left him half of his library, with the property of all such of his works already printed as he had not otherwise disposed of, and all the profits which should arise from any edition to be printed after his death. In 1745 Warburton married Miss Tucker, the niece of Ralph Allen, of Prior Park, Bath; and in right of his wife became possessed of that estate on Allen's death, in 1764.

He had now a great reputation. In April, 1746, he was elected preacher of Lincoln's Inn. His pen was ever busy. He produced an edition of Shakspeare in 1747, which did him little credit; an edition of Pope's works in 1757; sermons, and various other *opera*. He was still improving his fortune. He obtained one of the rich prebends of Durham; in 1757, the deanery of Bristol; and finally, in 1759, he was made bishop of Gloucester. His death took place on the 7th of June, 1779. He left no child, and his widow, in 1781, married the Rev. John Stafford Smith, who had been her first husband's chaplain. A complete edition of his works was published in 1788, by his friend Bishop Hurd, in 7 vols. 4to.

WARD, WARDEN, that is, Guard and Guardian. Ward is the term used in Durham, Westmoreland, and Cumberland, instead of the hundred of the midland counties or the wapentake of Yorkshire, to denote a subdivision of those shires. The neighbourhood of the border counties to the Scots rendered it essential that the military preparation of their inhabitants should be constant; and hence the subdivision of the county took the warlike appellation of 'ward,' rather than the more peaceful one of hundred. The great officers whose duty it was to defend the northern borders from the Scots, and the north-western from the Welsh, were called Lord Wardens of the Marches [MARCHES]; and we still have the Lord Warden of the Cinque Ports and the Lord Warden of the Stannaries. A castle or tower served not only as a place of defence, but also for the safe keeping of malefactors: hence, the keepers of some gaols are called warders.

By the Municipal Reform Act of the 5 & 6 Will. IV. cities and boroughs are divided into wards, each of which has the right of electing an alderman and a certain number of councillors.

WARD, WARDSHIP. [GUARDIAN.]

WARD-ROOM, in large ships of war, the cabin devoted to the use of all officers holding the rank of lieutenant.

WARDIAN CASE, a close cabinet of glass, closely fitted upon a trough containing soil, and designed for the growth of ferns and other plants in the windows of apartments. By condensation of the atmosphere they preserve a degree of humidity very favourable to the growth of certain kinds of vegetation, and in the windows of the better houses of London and other British cities they now form a very frequent and beautiful ornament. Their adoption probably suggested the use of aquaria and vivaria for the reception of marine and fresh-water animals. The inventor was a Mr. H. B. Ward, in 1829. Professor Faraday first called attention to them in 1838, and since that time they have greatly increased in popularity.

WARDMOTE (Saxon, *môte*, 'meeting'), a court in each of the twenty-six wards of the city of London, which is held for the regulation of matters of internal police. The institution dates from 1386.

WARDS. [MUNICIPAL CORPORATIONS.]

WARDS, COURT OF. The Court of Wards and Liveries was established by the statute 32 Henry VIII. c. 46, to superintend the inquests which were held after the death of any of the king's tenants by knight's service, for the purpose of ascertaining what lands the tenant died seised of, who was his heir, and whether the heir was an infant; and thus what rights accrued to the king in the shape of relief, primer seisin, wardship, or marriage.

By the statute passed in the first Parliament of Charles II. (12 Charles II. c. 24), the Court of Wards was abolished. There never was any such court in Scotland. The Court of Session has the jurisdiction in all cases of guardianship of minors.

WARD'S PASTE, a quack medicine, of which black pepper is a principal ingredient, formerly held in high repute as a remedy for the piles, abscesses about the rectum, and fistuline disorders.

WARE. [HERTFORDSHIRE.]

WAREHAM. [DORSETSHIRE.]

WAREHOUSING SYSTEM, a customs' regulation by which imported articles may be lodged in public warehouses at a reasonable rent, without payment of duties on importation, until they be withdrawn for home consumption. If they are re-exported no duty is charged. This system affords valuable facilities to trade, is beneficial to the consumer, and ultimately to the public revenue.

WARKWORTH. [NORTHUMBERLAND.]

WARMING and VENTILATION. Of late years the subject of ventilation has undergone a new development and is considered on true scientific principles. It has very justly been said that 'ventilation consists in getting rid of all vitiated air, and replacing it by fresh air. The great object is to get rid of this bad air in the shortest possible time. It ought, therefore, to be removed from the point nearest to where the vitiation has taken place; while, on the other hand, fresh air should be introduced at the point furthest removed from the occupants of the room to be ventilated.

According to General Morin, a distinguished French

engineer, the removal of the impure air by suction is more perfect in its results than by blowing it out.

A judicious arrangement of pipes and inlets will insure the removal of the air by suction without the assistance of a blowing apparatus.

Ventilation by suction is obtainable through a proper arrangement of the ordinary open fireplaces, stoves, or exhausting flues. Where possible, the air should proceed direct from the source of impurity, by special flues, towards the bottom of these fireplaces, whence it will be conducted into the external atmosphere.

Ventilation by suction is also superior to ventilation by blowing apparatus, on account of its simplicity, and the ease with which it may be adapted to the ordinary warming appliances. It is also advantageous in hospitals, because there is no danger of the diffusion of the vitiated air of one room to another when a current is created by the opening of doors and windows.

By the suction process, when applied to public buildings, the fresh air to be supplied is collected in the space between the ceiling and the roof. In summer it enters this space by openings communicating with the external air; in winter the space is filled by air which has previously been warmed by an apparatus under the building, and from which it is conducted by an ordinary flue. The air is allowed to descend into the apartment through numerous openings in the ceiling, and is induced to do so by being drawn off through similar orifices in the floor, the suction being produced by a fire lighted at the foot of a shaft communicating with the space into which the impure air has been drawn.

A ventilating system by compressed air has recently been proposed by Messrs. de Mondesir, Lebaitre, and Gullicane. A detailed description of it was submitted to the Society of Civil Engineers in France by the former gentleman, in March, 1867, and it was carried out with success in the exhibition building at Paris in the same year. We condense our account of it from an able report by Captain Webber, R.E., which appeared in the *Illustrated London News*, November 2, 1867.

Comparing his system by compressed air with those which he describes as by mechanical force and by the direct draught produced by heat, M. Mondesir claims a superiority in the amount of air moved by every pound weight of combustible employed. Supposing the air to be moving at the same velocity, he states, from experiment with a mechanical ventilator, that the value for every kilogramme of coal expended is 1200 centimètres; by the draught produced by the direct action of the heat on the air, for every kilogramme of coal the value is 2700 centimètres; and by experiment with his own system of using compressed air to induce a current, for every kilogramme of coal the value is 5588 centimètres. In a comparison of the two latter systems, an advantage is claimed for that of M. Mondesir, to the effect that in the first the consumption of combustible increases with the cube of the velocity, whereas in the last it increases only in proportion to its square.

In the system of ventilation by compressed air, a jet is introduced into a ventilating shaft of any size at a pressure from a small tube, and is turned in that direction in which it is desired to induce a current. Theoretically the quantity of compressed air leaving the jet, multiplied by its velocity, is equal to the quantity of air passing out of the ventilating shaft, multiplied by its velocity. Any of these conditions being given, the size of the tubes and value of the motive power can be easily calculated by means of the equations given in M. Mondesir's account.

The application of the system to the exhibition was the result of the experiments by M. Krantz, chief engineer of Ponts et Chaussées, and M. Tresca, of the Conservatoire des Arts et Métiers. It may be thus described:—The subterranean air shafts, which have a mean width of 10 feet, correspond in number with the circular and radiating passages of the building, and in the case of the former correspond in position. The external circular gallery, situated under the outside verandah of the building, is fed with air from openings in the park at a distance of 60 or 70 feet, at sixteen places nearly equidistant. From this, sixteen radiating galleries pass under the building to a distance of nearly 400 feet, reaching close up to the wall of the picture gallery; these communicate with others which coincide with circular passages, and in which are situated all the gratings for the admission of air. The galleries in each of the sixteen sections are isolated, so that each radiating gallery only communicates with the circular ones on its right-hand side, its left-hand wall being continuous. The pipe for the compressed air circulates in the outer gallery communicating with the pumping engines at the park. At each radiating gallery a tube of smaller dimension leaves it and enters for a few feet, then bending upwards, discharges the air along the gallery in a line coincident with its axis. By means of this jet the column of air in the galleries is set in motion, making its exit through the gratings at a rate which can be governed by the velocity at which the compressed air leaves the tube, the sectional areas of the openings in the gratings taken together being equal to the sectional area of the radiating gallery. To compensate for a deficiency of fresh air, openings with gratings have been made in the circular gallery itself.

It had been ascertained by previous experiment, that for every horse-power of motive force developed, 13,970 centimètres of air was moved in one hour, at the rate of 1 mètre per second of time. It was required that the air should enter the palace at the rate of 2 mètres a second, which would give a quantity equal to 6985 centimètres for every unit of horse-power, or 6700, allowing for friction. Supposing that 4375 persons were at one time in one section of the palace, and that each required a supply of 10 mètres of air per hour, they would require 43,750 centimètres altogether, to obtain which 6½ units of horse-power must be expended. To supply this in the same proportion throughout, four engines, amounting together to 105 horse-power, were established in convenient situations. The conditions are approximately the following:—The sectional area of the gallery is 6 mètres, through which the air moves at the rate of 2 mètres a second. The amount of air passing out of the orifice of the injector is 5 mètres per second, the size of which is adjusted so as to give the required velocity which, theoretically, should amount to 24 mètres, but practically must not be under 27 mètres. The cost of thus ventilating the palace of the Champs de Mars is calculated at about 1*d.* the 100 cubic mètres. The galleries all have louvre openings in the roof, and the circulation of the air is proportionally good, except where, for better ventilation, the proprietors have broken openings between them.

This system also enables the introduction of cooled air to the space to be ventilated, by making use of the fact that air, having gained in temperature by being under pressure, loses some by its detention in the tubes, and consequently, on expansion, falls to below the original temperature.

It is proposed to insure the steady and regular supply of fresh, and exit of vitiated, air in hospitals, by the

introduction of a jet into both supply and escape flues, only using heat to warm the air in winter to the necessary temperature. The principles of the system are to be found fully dilated upon in M. Mondesir's account, in which he describes his mode of applying it to public buildings, ships, and mines. Those already possessing the spare motive power may well consider the application of the new system to the ventilation of factories, workshops, and places where workmen are engaged in unhealthy occupations.

But the progress of modern science exhibits countless improvements in warming apparatus. It seems probable that ere long the old system, in which a house of ten rooms has a corresponding number of open grates with flues, and by which a considerable amount of coal and labour is usually wasted, will be entirely superseded in favour of more modern inventions based on scientific principles. Thus, we may instance the apparatus of L. F. Staib & Co., of Geneva, of which the most prominent characteristics are, great simplicity of construction, large heating surface for the size, and the advantage of adding moisture to the air. By an ingenious provision the air heated by it is not deteriorated. M. Warthmann, professor of physics at Geneva, subjected this apparatus to the most careful tests, employing it to heat his own country house, a building of nearly twelve apartments. It was first lighted in the coldest days of January, 1863, and after the second day emitted a temperature of 56° Fahr. in the centre of each room, at a level of 1 mètre from the floor; the mean external temperature being 21° Fahr. At a further period, 30 kilogrammes of coal per day, burning about twelve hours, made a difference of 36° Fahr. between the external and internal atmosphere of all the rooms; and this heat was maintained within 10° throughout the night. The house is well built of stone, in a very exposed situation, but no special precautions against cold have been provided.

But this is but one out of many. Messrs. Weibel, also of Geneva, exhibited in the Exposition Universelle of 1867 heating apparatus of all sorts and sizes. British manufacture was represented by the London Ventilation and Warming Company and Messrs. Musgrave & Co., of Belfast. M. Jolley & Co., of Paris, exhibited a stove for burning anthracite. Others, of less striking originality in design, were sufficiently numerous, but call for no mention here.

It is probable, as we have said, that the old stove system will be superseded; but much pressure will be required to overcome the determined conservatism of the British character in this particular. It will be sufficient for us to state that the generally received system is extremely deleterious to health, is productive of a terrible waste in coal, and involves much useless labour. There is no reason why a blazing hearth should not be retained in every house, or, in fact, an open grate in every room, if so required. But at the same time, every dwelling, rich or poor, might be warmed throughout by a slow combustion apparatus in the basement, which would utilize the whole of the fuel, instead of allowing nine-tenths of it to escape.

Several kinds of fire-places or stoves give out heat by *conduction* chiefly, others do so mainly by *radiation*. Open fire-places are of the latter kind, and a considerable loss of heating power results from the arrangement. The burning coals radiate heat into the room, and heat is also reflected from the metallic portions of the grate; but the heated air, which ought to contribute to the desired effect, is mainly allowed to escape up the chimney with the smoke and other results of combustion. Dr. Arnott, in his 'Treatise on Warming and Ventilation,' enumerates about a dozen evils which are more or less inseparable from open fires. Among these are waste of fuel, unequal heating, a stratum of cold air near the floor, the production of smoke and dust, loss of time in attendance, danger to person and property. Many contrivances have been brought forward to obviate one or other of these inconveniences. Count Rumford suggested the 'register stove,' the peculiarity of which consists in narrowing the throat of the chimney by a plate which can be moved to vary the size of the aperture; by this means, particularly if the opening be near the fire, the very hot air directly from the fire enters before it can mix with much colder air from the room, and thus the draught is increased so as to lessen the chance of smoking. But a great loss of heat is inseparable from this as from all other open fire-places.

The common Dutch is one of the simplest examples of a *close stove*. It generally consists of a cylindrical case of sheet-iron, within and near the bottom of which a grating is placed for containing the fuel. There is an ash-pit beneath the grating, and three openings to the interior—one to the ash-pit, one for introducing the fuel above, and one leading to a flue or chimney. In this form of stove the heated iron case warms the air, which thus becomes much more nearly equalized in temperature than it is by a common fire. There is also great economy of fuel, and an absence of smoke and dust; but the air of the room acquires a dry, sulphureous, and unhealthy condition. In Russian stoves, earthenware and brickwork are largely used, instead of metal, as a means of making the heat less intense near the stove, and of keeping up a reservoir of heat after the fire is extinguished. They are built in a massive style, and consist of a series of chambers, of which the lowest serves as the fire-place, and the upper ones as flues, and being composed almost entirely of brick and porcelain, the outer surface remains at a moderate temperature for a very long period.

Dr. Arnott has the merit of having devised an ingenious means to prevent the too intense heating of the air near close metallic stoves. In his form of stove the fuel is put into a small fire-box, inclosed within a larger case of sheet iron; the only openings in the outer case being a door at which the fuel is introduced, an air-hole beneath the grate, and a chimney for the exit of smoke, which chimney, being merely a metallic tube three or four inches in diameter, can be easily arranged in position. The interior of the outer case is nearly divided into two parts by a partition so adjusted as to cause a continued circulation of the heated air within, and hence an equable heating of the outer case. It is one point in Dr. Arnott's system to make the stove self-regulating, by providing apparatus whereby the valve will open and shut at the proper times to maintain any required temperature.

Numerous varieties of the close stove, bearing more or less on the above construction, have been brought forward of late years. Each professes to possess some peculiar merit; but all present these features in common—that the air-hole by which the combustion is fed is very small, and capable of adjustment; that there is a body of air to be warmed, external to the grate or fire-box itself, but confined within an outer case; that the consumption of fuel is much smaller than in any variety of open fire-places; and that the flue for carrying off the smoke and gases is small in diameter, and capable of being carried in any direction. In the different forms of 'kitchen-ranges' the open fire-place is combined with

what may be deemed a close stove; for the 'oven' and 'hot-closet' are representatives of the heated space within the outer case of a close stove. The 'gas-stoves' and 'American kitchen ranges' of modern inventors may in like manner be included in the same category, for they are in effect close stoves heated by various agencies.

In the arrangements above described, the stove is situated in the room which is to be warmed, and its heating effects are calculated with respect to that room alone; but in many factories and other large establishments the fire is in an outer or lower apartment, and the heated air is conveyed thence in a pipe to the room which is to be warmed.

The employment of steam-boilers in large establishments where steam-engines are worked, is one of the circumstances which have led to the very extensive adoption of the method of warming by steam. A marked difference is observable in the principle of this plan, as compared with that of hot-air warming. The steam is not permitted to mingle with the air of the room which is to be warmed, but acts through the medium of a metallic tube confining it, which it raises to a temperature sufficient to warm the room. The efficacy of this mode of heating depends on the great capacity for heat which steam possesses, a capacity equal to 1000°; that is, a pound of water at 212° will absorb a thousand degrees of heat in becoming a pound of steam. Steam will thus communicate as much heat as a mass of red-hot iron; and it will have this advantage over the iron, that it can carry this heat to a distance without a similar loss, because the heat, being latent, will not be given out until it arrive at its destination, and become condensed, when the whole of the 1000° will be usefully applied. Mr. Scott Russell calculates that a room containing 500 cubic feet of air, and exposing 400 feet of surface, may be maintained at a temperature of 20° above that of the air without—that is to say, at 60° in the inside of the room when the atmosphere is at 40° without—for a space of twelve hours, by the evaporation of two gallons of water, and at the expense of about three pounds of coal. This mode of heating buildings is adopted to a very large extent in the steam-power factories of Lancashire, Yorkshire, Cheshire, &c. In the cotton, woollen, and flax mills, dye, bleaching, and print works, and similar establishments, the facilities for producing a constant supply of steam are so great that it becomes the most economical system that can be adopted.

In a large museum and lecture-room at New York, called the Union Buildings, there are no less than 8 miles of small pipes arranged in the basement, and filled with high-pressure steam. A fan-blower, 12 feet in diameter, sends a vast body of air through the pipe-rooms; and the air thus warmed finds its way into spaces beneath every floor. A hole of 1 inch diameter is made through the floor under every chair or seat in the lecture-hall, 2300 in number; up these holes warm air is sent in winter, and cold in summer.

Heating by hot water, though not so much adopted in factories as the steam method, is perhaps of more extensive application in other buildings. Where all the apartments to be warmed are on one level, an open boiler may be used; but where it is necessary to carry the pipes to different floors of a building, some of them much above the level of the boiler, the boiler must in that case be closed. When an open boiler is employed, a pipe branches out from the upper part of the side, extends horizontally through the rooms to be warmed (without in any case rising above the level of the water in the boiler), and returns again to the latter, which it enters at a lower level than the other. Under this arrangement a current of heated water will flow from the boiler at the upper, and, after traversing the tube, return to the lower orifice. The closed boiler is, however, more extensively useful, since it enables all the stories of a building to be warmed by one apparatus. The whole system, including both tubes and boiler, is filled with water at a valve at the highest point; and when heat is applied to the boiler, a circulation ensues which speedily causes the whole length of tubing to become hot. Various modifications of this hot-water system have been adopted in the houses of Parliament, in the British Museum, and other public buildings.

In 1850, at the instance of the General Board of Health, a commission of several scientific gentlemen was appointed to inquire generally into the modes of warming and ventilating public buildings. Experiments were made in the board-room of the General Board of Health, on the temperature of the air, walls, and floor, and on the hygrometric state of the air; then at the Wellington Barracks, in different soldiers' rooms, heated by different kinds of open fires. Other experiments were made to determine the effect of duplicate panes of glass; and to determine the chemical and general state of the air.

Among the results which the commissioners arrived at were the following:—Smoke from almost all fires for warming rooms may be avoided. The ventilation of rooms ought *not* to be attempted by any peculiar form of grate; the grate ought to be devoted to the due burning of the fuel, leaving the ventilation to be achieved by other means. In all open fire-grates reflecting surfaces should be used to increase the amount of heat radiated into the rooms. Chimney flues should be of much smaller dimensions than are customary. The flue should not be situated in the outer wall of the house, so as to become chilled by the external air; it should be provided with a closing aperture, placed far back to increase the intensity of the combustion. Fire-brick lining should be used. Sunken ash-pits and hidden ash should be provided. The grate is best situated when it is visible from the greatest number of places in the room; and the burning mass in it should be broad rather than deep. It should not be so near the floor as is customary in the better kind of houses.

WARMINSTER. [WILTSHIRE.]

WARNER, WILLIAM, a native of Oxfordshire, is supposed to have been born about 1558. He was a student at Oxford, but left the university without a degree, and, going to London, became an attorney in the Common Pleas. He died suddenly in 1609. He was the author of 'Albion's England,' an historical poem, or rather a collection of ballads, in thirteen books, in the Alexandrine stanza. This work, in his own time, was popular, and was frequently reprinted in the course of the thirty years after 1586, when it was first published. It is included in Chalmers' 'British Poets.' Warner was also the author of 'Syrinx, a Seavenfold Historie,' a collection of prose stories, published in 1597; and is supposed by Warton and others to have produced the translation of the 'Menœchmi' of Plautus, which first appeared in 1595, and was reprinted by Steevens in 1779, in his 'Six Old Plays, on which Shakspeare founded,' &c.

WARNE'RIA, a genus of plants named by Miller in honour of Warner, a botanist of Essex. It is now called *Hydrastis*, and contains but a single species. It belongs to the natural order *Ranunculaceæ*. The

only species is called *H. Canadensis*. It is a native of North America, in watery places in tracts along the Alleghany mountains, from Canada to the Carolinas. The head of its fruit very much resembles that of the raspberry.

WARNETON. [FLANDERS, WEST.]

WARP, in Naval Technics, a rope laid out for the purpose of moving a ship, which is then said to be *warped* into its prescribed position. A vessel is frequently *warped* into harbour, when the entrance is narrow or difficult of access. In WEAVING, the warp is the *longitudinal* threads of a woven fabric, which are crossed by the *woof*, or *transverse* threads.

WARPING (French, *guerpier*), the operation of increasing the fertility of tillage lands on the banks of rivers which are liable to inundations. It appears that this mode was first introduced in England on the banks of the Ouse, the Trent, and other streams which flow into the estuary of the Humber. As they traverse a great extent of alluvial country, their waters, after heavy rains, are charged with mud and earth, and while in this state they are conducted over the adjacent lands in portions inclosed by embankments, and there permitted to deposit their burthen. The deposit is called the *warp*, and as it is frequently two or three inches deep, it greatly increases the fertility of the soil.

WARRANT. A warrant is a delegation by A, who has power to do some act, of that power to B. A sheriff who has power to arrest, &c., may give a warrant to his bailiff to act for him. A landlord who has power to make a distress upon his tenant may give a warrant of distress to another for that purpose. A magistrate who has authority to bring before him persons who are within his jurisdiction, and reasonably suspected of having committed certain offences, may make a warrant to others to do that act. A warrant should be in writing, and ought to show the authority of the person who makes it, the act which is authorized to be done, the name or description of the party who is authorized to execute it, and of the party against whom it is made; and in criminal cases, the grounds upon which it is made. The sense in which the word warrant is more generally known relates to criminal matters. The warrant should always be under the hand and seal of the justice who gives it; and it should be addressed to the constable or constables, or to some private person by name; and the constable or the private person acting within the justice's jurisdiction will not be liable for any of the consequences of obeying a proper warrant. The warrant must name the person against whom it is directed. A warrant to apprehend all persons suspected, or all persons guilty, &c., is illegal; for the pointing out of the individual person to be apprehended is the function of the justice, not of the officer. The warrant should also set forth the time and place of making it, and the cause for which it is made. A warrant may be to bring the party before the justice who grants it, or before any justice of the same county. A warrant of a justice of one county cannot be executed in another until it has been backed, that is, signed by some justice in that other county; and the same provision has been also enacted with respect to warrants granted in any one of the three kingdoms, and requiring to be executed in any other. But a warrant granted by one of the judges of the Court of Queen's Bench is tested England, and may be executed in any part of the kingdom. A warrant is in force until it has been executed, if the justice who granted it be still alive. After the party is apprehended, the officer ought forthwith to carry him wherever he is directed by the warrant. Much of what has been said as to a warrant of apprehension is equally applicable to a Warrant of Commitment, by which a justice authorizes a commitment of a party to prison, either to suffer a summary punishment or to await his trial. A Search Warrant is a document which authorizes a search to be made for stolen goods.

A Warrant of Attorney is a writing by which a man authorizes another to do an act for him, as his agent or deputy. [LETTER OR POWER OF ATTORNEY.] But the term is most commonly applied to cases where a party executes an instrument of that name, authorizing another to confess judgment against him in an action for a certain amount named in the warrant of attorney. [COGNOVIT.]

WARRANT OFFICER. In the Navy, the boatswain, gunner, and carpenter, are so called, to distinguish them from mates, lieutenants, and others, who hold *commissions*.

WARRANTY. The doctrine of *warranty of lands* was formerly an important part of legal learning; but the effect of warranties having been gradually reduced within very small compass, the subject has now become of little practical use. Still it is necessary for those who would properly understand the English law of real property to pay some attention to this difficult subject. All the learning upon the subject is contained in 'Coke upon Littleton,' with the notes of Hargrave and Butler.

As to things personal, a purchaser of goods and chattels may have satisfaction from the seller, who sells them as his own, and whose title is defective, without any express warranty, if there be any fraudulent misrepresentation or concealment by the vendor; but it seems not otherwise. But the vendor is not answerable for the quality of the wares, unless he warrants the quality, or unless he knew the quality to be not sound and good, and has used art to disguise the defects, or has misrepresented them to the buyer. No particular form of words is necessary to make a warranty. There also may be warranty by implication, as when goods are sold by sample. The various rules as to warranty may be found in books which treat of contracts.

In Scotland there are various kinds of warranty—1. *Real*, where one parcel of land is pledged for another; 2. *Absolute*, where a party pledges a title against all objections; 3. from *fact and deed*, where he only warrants the title from his own acts. In sales of moveables under the *Mercantile Amendment Act*, warranty must be *expressed* and not merely *implied*, and may be proved by parole.

WARREN. A Free Warren is a franchise which gives a right to have and keep certain wild beasts and fowls, called game, within the precincts of a manor, or any other place of known extent, whereby the owner of the franchise has a property in the game, and a right to exclude all other persons from hunting or taking it.

It does not appear that the crown ever had the right of granting free warren to one person over the lands of another. The right exists by prescription. The franchise still exists in some places in England, and is justly viewed as an intolerable remnant of feudalism.

WARRINGTON. [LANCASHIRE.]

WARSAW (Polish, *Warszawa*; German, *Warschau*; French, *Varsovie*; Italian and Spanish, *Varsovia*), formerly the capital of the kingdom of Poland, and now the chief city of the Russian province of Warsaw, is situated partly on a flat, and partly on an eminence rising gradually above the left bank of the Vistula, in 52° 13′ N. lat., 21° 2′ E. long., and contains about

240,000 inhabitants. It is connected by railways with Vienna and Berlin (from each of which it is about 340 miles in a straight line); and also with Leipzig, Cracow, and St. Petersburg—the latter 668 miles distant.

Warsaw consists of the city itself—divided into the old and new towns—and of several suburbs: the total circumference of which is 10 miles, but many gardens and fields are included in this area. The suburbs possess some spacious roads and handsome buildings; but in the old city the streets are generally narrow, ill arranged, and dirty. There are no regular fortifications, but the town is surrounded with lines, and after the insurrection of 1830 a very strong citadel was erected with a view of overawing the inhabitants, and preventing any further outbreak. From its situation this citadel commands every part of the city. Formerly Warsaw was connected with Praga, on the opposite bank of the Vistula, by a bridge of boats 1600 feet long; but this has been recently removed, and a fine iron bridge on granite piers erected in its stead. The suburb of Praga, though at one time extensive, is now totally decayed, and all but deserted. The city has an imposing appearance from a distance—especially from the St. Petersburg road—on account of its being built on the ascent from the river, which of course displays its public buildings to the best advantage. This impression is, however, dispelled on entering the town, which, internally, presents striking contrasts of magnificence and misery; for most of the private houses are mean, and the streets and squares generally badly paved and lighted. Warsaw has been kept down so long with an iron rule by the Russian soldiery that it presents a very mournful and deserted aspect; and there are now scarcely any amusements, although the Poles are naturally a very merry and light-hearted people, and formerly supported five theatres here. One of the most interesting public buildings is the *Zamek*, a royal palace built by King Sigismund III., who transferred his court to this place from Cracow in 1566. It contains the hall of the Polish diet, and the archives of the kingdom; and is still occasionally used by the czars of Russia. The Saxon palace has a spacious court and gardens, which are open to the public, and are considered the finest promenade in the city. The Krasinski palace, a very fine building, now used by the government, contains the national theatre, custom-house, high tribunals, and public offices; and also has attached to it some gardens, which are a fashionable place of resort. The other principal edifices are—the Casimir Palace, or Academy of Sciences, with a statue of Copernicus (who was a Pole by birth), erected in 1830; the new exchange; the old archiepiscopal residence; the palaces formerly belonging to Counts Radzivil and Brühl; the university buildings; nearly 100 other mansions of the Polish nobility; the Roman Catholic cathedral of St. John, which is a Gothic building of great beauty, dating from 1250, and contains a fine altar-piece, besides many interesting statuettes and monuments—one of the latter by Thorwaldsen; a Greek united cathedral; many other colossal places of worship, including St. Alexander's, St. Borromeo's, the Holy Cross, and St. Augustine; the church of the Carmelites, interesting as the spot where the league was concluded between Charles XII. of Sweden and Stanislas Leczinski; a beautiful Lutheran church (the loftiest and one of the finest buildings in Warsaw); several convents with churches; Armenian and English chapels; and numerous synagogues—there being more Jews here than in any other city in Europe. The Marieville bazaar is a large square surrounded by arcades, in imitation of the Palais Royal at Paris. Warsaw also contains a national bank, established by order of the late Emperor Nicholas in 1828; a mint, arsenal, barracks, and school of artillery; six hospitals; deaf and dumb asylum; observatory, botanic garden, musical conservatory, and numerous charitable and useful institutions. Its once famous university was suppressed after the insurrection of 1830 (the valuable library of 150,000 volumes being removed, with many art treasures, to St. Petersburg in 1831); but it has lately been re-established through the instrumentality of the Grand Duke Constantine, the governor of the district. The other educational establishments are a theological seminary, rabbinical college, several gymnasia, schools of art, numerous Russian schools, libraries, &c. The Russian language is compulsorily taught in all the schools; and everything published in the city is subject to the most rigorous censorship.

The principal articles made in Warsaw are woollen and linen fabrics, hosiery, hats, gold and silver wares, saddlery, paper, and tobacco; and some of the inhabitants are also employed in chemical and cotton printing works, breweries, &c. There are large fairs in May and September, which are frequented by the merchants of both Europe and Asia. The Vistula at Warsaw is much broader than the Thames at Westminster; but it is very shallow, and its bed is constantly shifting, so that it is only navigable for large vessels when it is swelled by the autumn rains, or when torrents of melted snow pour down into it from the Carpathians after a thaw. The principal trade is in wheat, which is exported to Danzig by river; but the general foreign commerce is declining.

There are several large and memorable squares in the city, containing many fine statues, the most striking of which is a gilt bronze figure of King Sigismund III., erected by his son, Ladislas IV. This stands on a marble column 26 feet high, before the Cracow gate, and in an inclosure called the Sigismund Square. The equestrian statue of Prince Poniatowski, who fell at the battle of Leipzig, has been taken down. In the church of the Capuchins is a splendid monument in honour of King John Sobieski, erected by the Emperor Nicholas. Warsaw is also furnished with some of the finest drives and promenades of any European city; and in the immediate vicinity is a villa, formerly the residence of Stanislaus Augustus, containing fine paintings, and surrounded by public grounds, in which is a statue of Sobieski. The favourite retreat of the latter celebrated monarch, the chateau of Willanov (with a fine park), which was built by him, is about 3 miles from the town. The field of Vola, where the Polish kings were formerly elected by the nobles, is 5 miles distant.

Warsaw succeeded Cracow as the capital of Poland in 1566. In 1807 it was made the capital of the Grand Duchy of Warsaw; and in 1815 of the Russian kingdom of Poland. In 1830 the Russians were driven from it by the Poles, but they retook it in 1831. In 1861 another insurrection broke out, and on the 8th April in that year forty unarmed and unresisting Poles were massacred in Sigismund Square. The mean temperature of the year at Warsaw is 44·1; in winter, 24·9; and in summer, 63·2 Fahr.

WARTON, JOSEPH, D.D., the eldest son of the Reverend Thomas Warton, professor of poetry in the University of Oxford, was born at Dunsford, in the house of his maternal grandfather, in 1722, and at the age of fourteen was admitted on the foundation of Winchester College, whence he went to Oriel College, Oxford, in

1740. In 1748 he was presented to the rectory of Winslade, in the neighbourhood of Basingstoke. Warton had been at an early age a poetical contributor to the *Gentleman's Magazine*. His next printed composition appears to have been his ode entitled 'Superstition,' which he sent to Dodsley's *Museum*, in April, 1746. The same year he published a volume of odes and other poems. In this or the next year he joined his brother Thomas in publishing by subscription a volume of his father's poems. In 1749 appeared his 'Ode to Mr. West' (Gilbert West, the translator of Pindar).

In 1751 he accepted the invitation of the duke of Bolton to accompany him on a tour to France. After his return to England he published an edition of Virgil, accompanied with a new translation in verse, of the 'Eclogues' and 'Georgics' by himself, and one of the 'Æneid,' by Christopher Pitt. The work, which appeared in 1753, brought him great reputation at the time; and is stated to have been the ground upon which he was honoured by the University of Oxford with a diploma of M.A. in 1759.

Among the most popular of his literary performances are some papers on critical subjects which he contributed to the *Adventurer*, in 1753. In 1755 he was elected second master of Winchester School. He published, in 1762, the first volume, in 8vo, of the work by which he is principally known, his 'Essay on the Writings and Genius of Pope.' Its conclusion, in a second volume, did not appear till 1782.

In 1766 he became head master of Winchester School, upon which occasion he visited Oxford, and took his degrees of Bachelor and Doctor in Divinity. He resigned the mastership of Winchester School in 1793. After this he undertook an edition of Pope's works with notes, which he completed in 9 vols. 8vo, in 1797. It was followed by the commencement of a similar edition of Dryden, of which he lived only to publish two volumes. He died February 23, 1800.

WARTON, THOMAS, the younger brother of the above, was born at Basingstoke in 1728. He was admitted a commoner of Trinity College, Oxford, in March, 1743. He was soon after elected a scholar, took his degree of M.A. in 1750, succeeded to a fellowship in 1751, and spent the rest of his life in his college, employing his time partly as a tutor, partly in literary occupations.

The first production that attracted public attention was his 'Triumph of Isis,' published in 1749, in reply to Mason's 'Isis,' which was a satire upon the loyalty of Oxford. In 1750 he contributed a few pieces to the *Student, or Oxford and Cambridge Miscellany*, and amongst them his 'Progress of Discontent,' one of the happiest of his humorous effusions. The next year he published his satire entitled 'Newmarket,' and some other pieces in verse. In 1753 he edited a small volume, which appeared at Edinburgh, with the title of 'The Union, or Select Scots and English Poems,' among which were several of his own compositions. In 1754 he published, in an octavo volume, his 'Observations on the Faerie Queene of Spenser.' It was extended to two volumes in a second edition, which appeared in 1762.

In 1757 he was elected professor of poetry. During the next ten years he published several small works, edited others, contributed to the 'Biographia Brittanica,' the *Idler*, &c. He took his degree of B.D. in 1767, and in 1771 he was instituted to the small living of Kiddington, in Oxfordshire. This and the donative of Hill Farrance, in Somersetshire, which he was presented by his college in 1782, were his only ecclesiastical preferments. In 1774 he published the first volume, in quarto, of his great work, 'The History of English Poetry.' A second volume appeared in 1778, and a third in 1781; it remains, however, unfinished. Warton made a collection of those of his poems which he thought worthy of preservation, and published it in 1777; and other editions followed in 1778, 1779, and 1789. He was made poet-laureate on the death of William Whitehead; and the same year he was elected Camden professor of history at Oxford. He died May 21, 1790. A Life of Warton was prefixed to a new edition of his poems, by Dr. Mant, in 1802.

WARTS, the name of small tumours or excrescences which occur on the cuticle. Like all other epidermoid tumours, they are unorganized in their origin and course. They are generally of a conical form, embrace only a small extent of surface, are hard, insensible, and in colour are usually darker than the surrounding surface. In structure they have a radiated character. Their growth is slow, and they derive their nutriment from the cutis over which they lie. The parts of the body on which these excrescences most frequently occur are the hands and fingers, although they are not entirely confined to these localities. They are of an innocent character, and produce no ill consequences, except by pressure, when they occur in such parts as between the fingers and toes or on the eyelids.

When stimulated strongly, they generally get smaller or disappear altogether. Hence the best mode of treatment is the application of stimulants, such as nitrate of silver, caustic, or strong acetic acid.

WARWICK. [RHODE ISLAND.]

WARWICK, the county town of Warwickshire, a parliamentary and municipal borough of great antiquity, is finely situated on elevated ground, near the bank of the river Avon, 94½ miles from London. Its earlier annals are shrouded in impenetrable obscurity, but it is certain that it was a town of some importance in the Saxon era. It is said to have been named after Warremund, king of Mercia. A castle was founded here in 915, by Ethelfleda, daughter of Alfred the Great. After the Conquest, Henry de Newburgh was created Earl of Warwick by the Conqueror, and both the town and castle were considerably strengthened. In the reign of Edward I. Warwick was the scene of several tournaments. James I. visited it in 1617, and was splendidly entertained at Leicester's Hospital. It suffered severely during the Civil War, and in 1694 was partly destroyed by fire. In 1695 it was visited by William III.

The town contains several edifices of peculiar interest. Leicester's Hospital, a fine example of the ancient half-timbered building, was endowed by Robert Dudley, earl of Leicester, with estates which now yield 3000*l.* per annum. It supports twenty-two brethren, veteran soldiers, with a yearly allowance of 80*l.* each, and a master, with an annual salary of 400*l.* The college school was founded by Richard Beauchamp, temp. Henry IV. The collegiate church of St. Mary is a noble structure, which was modified about 1704, from the designs of Sir Christopher Wren. The tower is 130 feet high, and crowned with pinnacles rising to a further height of 44 feet. The extreme length of the church is 180 feet; its breadth, 106. Of the original building, the choir, the lady chapel, an exquisite specimen of the purest Gothic, dating from 1443, the chapter-house,

lobby, and vestry-room, are still extant. The choir is richly ornamented, and contains, with other interesting monuments, the sarcophagus of Fulke Greville, Lord Brooke, 'Servant to Queen Elizabeth, Counsellor to King James, and Friend to Sir Philip Sidney.' In the lady chapel are interred Richard Beauchamp, the founder, and Queen Elizabeth's earl of Leicester. St. Nicholas' is a modern church, erected in 1799. The county hall was built in 1776, the court-house in 1730. There are also two other churches, dissenting and Roman Catholic chapels, a museum, market hall, corn exchange, a county gaol, a public library, the east and west gates, several good hotels, and a commodious railway station. The trade of the town is inconsiderable, though a portion of the population is employed in wool combing, cotton weaving, and the manufacture of lace and hats.

Warwick castle, 'that fairest monument of ancient and chivalrous splendour, which yet remains uninjured by time,' crowns a rock, whose base is washed by the Avon, on the south-east side of the town. Some portions are of venerable antiquity, but, during the Barons' War, the main buildings were razed to the ground. The castle was then restored by Thomas de Beauchamp, earl of Warwick, temp. Edward III.; enlarged by his son, who built Guy's tower in 1394; and beautifully embellished by Sir Fulke Greville, afterwards Lord Brooke, in the reign of James I. In the Civil War it was successfully held for the Parliament. The castle and estate still belong to the Greville family, on whom the earldom of Warwick was bestowed in 1759. The second earl of this line, grandfather of the present noble owner, expended large sums in the adornment of his ancestral seat, and formed its fine collection of pictures by Vandyck, Rubens, Rembrandt, Paolo Veronese, Guido, and other great masters. In the porter's lodge are preserved the relics of the legendary Guy, earl of Warwick, including his 'porridge pot' of 102 gallons. Externally, the most interesting features of the castle are the towers—Cæsar's is 147 feet high; Guy's, 130 feet. The green-house contains the famous ancient *chef-d'œuvre*, the Warwick vase, a circular basin of white marble, 21 feet in circumference, and beautifully sculptured, found at the bottom of a lake at Tivoli in 1771. In the interior, the visitor's attention will be chiefly directed to the great hall, 62 feet long, 40 feet wide, and 35 feet high, with an elaborately-wrought Gothic roof of modern design; the great dining-room, 43 feet by 25 feet; the red drawing-room; the cedar drawing-room, 47 feet by 25 feet; the gilt drawing-room; the state bed-room; Lady Warwick's boudoir; and the compass room. Each apartment is rich in glowing pictures, beautiful statuary, and objects of art and vertu.

Warwick is a municipal borough, governed by a mayor, five aldermen, and eighteen councillors. The county assizes are held here. It returns two members to Parliament. In the vicinity is Blacklow Hill, where Piers Gaveston, the favourite of Edward II., was executed by Earl Guy in 1312. Population of the borough, which comprises the two parishes of St. Mary and St. Nicholas, 10,570.

WARWICK, GUY, EARL OF. Several of our mediæval chroniclers speak of this famous personage as having actually existed: he may now, however, be considered as belonging not to history, but to fable and romance. Camden was perhaps one of the first inquirers among us who ventured to intimate so much, in his account of the earls of Warwick which occurs in the 'Britannia.' Even as a hero of legend and fable, Guy can scarcely be traced with certainty to a more remote date than the earlier part of the fourteenth century. An account of the romance, with copious extracts, is given in Ellis' 'Metrical Romances,' vol. ii., pp. 3-94. For a compendious summary of the hero's exploits, the reader may turn to the 'Legend,' printed by Percy, or to the twelfth and thirteenth songs of Drayton's 'Polyolbion.' The modernized prose abridgment of Sir Guy of Warwick used to be a common stall pamphlet.

WARWICK, RICHARD NEVIL, EARL OF, called the 'Kingmaker.' [EDWARD IV.]

WARWICKSHIRE, a midland county of England, is bounded N. for a limited extent by Derbyshire, N.E. by Leicestershire, E. by Northamptonshire, S.E. by Oxfordshire, S. and S.W. by Gloucestershire, W. by Worcestershire, and N.W. by Staffordshire. In outline it is irregular, but its general shape may be roughly described as an oval. The greatest length N. to S. is 51¼ miles; the greatest breadth E. to W. is 36 miles. A detached portion of the county on the W. is wholly inclosed by Worcestershire, in the neighbourhood of Bromsgrove; and another detached portion on the S.W., near Shipston-on-Stour, is surrounded by portions of Worcestershire and Gloucestershire. The county is situated between 51° 58′ and 52° 42′ N. lat., and between 1° 10′ and 2° W. long. The area is 881 square miles, or 563,946 acres, of which 151,460 are under corn crops, 32,780 under green crops, 13,500 fallow, and 209,920 in permanent pasture. The population in 1861 was 561,855, inhabiting 116,351 houses. In 1851 the population was 475,013.

Surface and Geology.—Warwickshire has no mountainous heights, but the whole county is occupied by gentle hills of moderate elevation with intervening vales. The highest ground is at Corley, in Hemlingford hundred, and in the vicinity of Packington. Ancient writers divide the shire into the Feldon, or level country, and the Arden, or woodland, the line of separation being the Avon; but no such distinction now exists. The south-eastern border is skirted by hills composed of the lower formations of the oolitic series, overlooking the valley of the Stour and the Vale of Red Horse, anciently so called from a colossal figure of a horse carved in the ferruginous sands of the slope of Edge Hill, which has been obliterated by the progress of inclosures, and replaced by one of much smaller dimensions. Extensive quarries of gritstone, part of the oolitic series, occur on Compton Hill. The valley of the Stour and the Vale of Red Horse, which skirt the foot of the oolitic hills, are occupied by the beds of the lias formation. The remainder of the county chiefly consists of formations of the red marl and new red sandstone group; and is included in the great midland red marl and new red sandstone district. There is but one coal-field: it extends in length 16 miles S.S.E. to N.N.W. from Wyken and Sow, two villages near Coventry on the E., to the border of Staffordshire near Tamworth, with an average breadth of about 3 miles.

The principal minerals are freestone, limestone, blue flagstone, ironstone, blue clay, marl, and manganese. Mineral springs are found at Leamington (where they are still much frequented), Kington, Stratford-on-Avon, Southam, Willoughby, King's Newnham, and on the Coleshill road, near Birmingham.

Rivers, Canals, and Railways.—The greater part of Warwickshire belongs to the basin of the Severn; a considerable portion in the N. is included in the basin of the Trent, and a small portion to the S.E. in that of the Thames. No part of the course of the Severn is in the

county; the drainage of which is conveyed into that river by the Avon, one of its most important tributaries. The Avon rises in Northamptonshire, and enters Warwickshire under Dove Bridge, about 12 miles from its source. From Dove Bridge it flows in a winding channel W. and S.W. to Warwick, traversing the Castle Park, and running S. and S.W. to Stratford-upon-Avon; thence it proceeds, partly within, partly upon the border of the county, till it quits it just above Harvington Mill. Its course in Warwickshire is altogether 57 miles, and its total length in round numbers 100 miles. The navigation does not extend above Stratford, so that it is navigable only for 42 miles, or less than half its course. Its feeders are, the Swift (10 miles long), the Sow (20 miles), the Leam (30 miles), the Dene (13 miles), the Stour (24 miles), and the Arrow (18 miles).

That part of the county included in the basin of the Trent is drained by the Tame, which rises about 3 miles N.W. of Walsall in Staffordshire, and flows S.E. to Aston, near Birmingham, above which it enters Warwickshire. It then runs E.; afterwards turning N., it quits the county at Tamworth, and still preserving its northward direction enters the Trent at Alrewas in Staffordshire. Its whole course is about 44 miles, of which 22 miles are in Warwickshire, or on the border. Its feeders are, the Rea (12 miles long), the Blythe (18 miles), the Bourne (10 miles), and the Anker (26 miles). Neither the Tame nor any of these affluents is navigable.

The deficiency of river navigation, which in Warwickshire is limited to a small part of the course of the Avon below Stratford, is compensated by the number and importance of the canals. The construction of the Grand Trunk, or Trent and Mersey Canal, which follows through Staffordshire and Derbyshire the course of the Trent (the first Act for which was obtained in 1766), may be considered as having given the first impulse to the canal navigation of Warwickshire, though no part of the Grand Trunk is within that county. In 1768 an Act of Parliament was obtained, authorizing the formation of the Coventry Canal, which commences in the Grand Trunk, near Alrewas, in Staffordshire, and extends to Coventry. Its whole length is nearly 38 miles, 27 of which are in Warwickshire. The Oxford Canal was commenced under an Act obtained in 1769. It starts from the Coventry Canal at Longford, and opens into the Thames at Oxford. Its whole length is about 84 miles; of which about half is in Warwickshire, and half in Northamptonshire. The other canals of less importance are, the Ashby-de-la-Zouch (26 miles long, 5 miles of which are in this county); the Birmingham, now called the Old Birmingham (22 miles long, including its branches, and belonging chiefly to Staffordshire, little more than 2 miles being in Warwickshire); the Birmingham and Fazeley (15 miles long, two of which are in Staffordshire); the Worcester and Birmingham (29 miles long, but only the 3 miles nearest to Birmingham are in Warwickshire); the Stratford-upon-Avon (23 miles long, by far the greater part belonging to this county); the Warwick and Birmingham (22 miles long); and the Warwick and Napton (14 miles long).

The London and North-Western Railway at Rugby divides into two branches, one of which passes through Tamworth and the other through Birmingham. Branch lines extend from Coventry S. to Leamington, and N. to Nuneaton. Other branches, in connection with this colossal system, extend from Birmingham and from the Hampton station on the Coventry and Birmingham line northwards through Tamworth into Derbyshire. The Great Western Railway has an important branch from Oxford, through Banbury, Leamington, and Warwick, to Birmingham and Birkenhead; and a smaller branch from Hatton, through Stratford-upon-Avon, to the Oxford, Worcester, and Wolverhampton line at Honeybourne. The Midland, Trent Valley, and several other railways, enter Warwickshire at Rugby.

Agriculture.—This county, being situated nearly in the centre of England, enjoys a comparatively mild and healthy climate. Except in the higher and more exposed situations, where the land is cold and heavy, the harvest occurs as early as in the southern districts.

The soil varies extremely, two or three different kinds being often met with in a field of no great extent. The red loam, which is found to a considerable extent across the centre of the county, especially between Warwick and Coventry, and from the borders of Worcestershire to Leicestershire, is mostly of a superior quality; all of it very fit for white crops, and much of it capable of bearing both beans and turnips. Where the loam inclines to sand, the subsoil is chiefly limestone, marl, or sandstone; and under the colder and heavier loams the substratum is clay. There is also a fertile clay on limestone.

On the light loams and sands turnips have long been cultivated. A great extent of excellent pasture-land is laid down, and though some of it is very capable of being converted into arable, and farmed on the convertible system of husbandry, the landlords do not readily give their tenants leave to break up old sward.

On the heavy soils in this county, as in most others, the custom of continually ploughing from the crown and gathering the furrows, as it is called, had produced such high ridges that a man might be hidden behind them; and the water always running down the steep sides of the ridge, formed a kind of morass in the deep intervals. Most of these high ridges, however, have since been levelled, and a better system of ploughing introduced. Thorough draining has recently made considerable progress; and where the subsoil is clay, the practice will no doubt soon become universal. The great superiority of the rich loams lying on sandstone arises in part from their being under-drained by nature, without which all their natural fertility would have been of little advantage. In 1866 wheat was grown on 72,956 acres, barley on 29,834, oats on 13,621, beans on 22,503, peas on 12,327, rye on 215, potatoes on 2544, turnips and swedes on 20,429, mangold on 3686, carrots and cabbage on 775, clover and artificial grasses on 37,078, vetches on 5337, and hops on 7 acres.

At one time the forest of Arden occupied a large portion of the centre of Warwickshire, which is still extremely well wooded, and the scenery, in general remarkably rich and charming, is varied by moor and heath.

There is no breed of cattle peculiar to the county. The dairy cows are chiefly long-horns, crossed in every possible way. The large-polled or ancient Warwickshire sheep are nearly forgotten, having been superseded by the New Leicester and a cross of the two breeds: for folding, the South Downs are preferred. The stock of sheep is about 300,000, and of cattle 70,000. The produce of wool averages 10,000 packs annually. Few of the farms are of large extent, the usual area not exceeding 100 acres.

Manufactures.—Warwickshire ranks high as a manufacturing county. Birmingham is the principal seat of hardware; and nowhere, perhaps, has the combined influence of ingenuity, skill, and capital been more

astonishingly displayed than in the immense variety, beauty, utility, and cheapness of the articles produced in this great workshop. Coventry has been long distinguished for its proficiency in the silk trade, especially ribbons, and for the manufacture of watches. Needles and fish-hooks are made at Alcester, hats at Atherstone, and leather and horn goods at Kenilworth. There are also manufactories for making paper, boots and shoes, gloves and stockings, lace, glass, carriages, and chemicals, in various parts of the county.

Divisions and Towns.—Warwickshire in divided into four hundreds, and 206 parishes. It is in the diocese of Worcester, and comprehends the archdeaconry of Coventry, and part of the archdeaconry of Worcester. It is in the Midland Circuit, the assizes being held at Warwick. For parliamentary purposes it is divided into North Warwickshire and South Warwickshire, each of which returns two members to Parliament; in addition to which Coventry and Warwick return each two, and Birmingham, by the Reform Act of 1867, three members: total, eleven.

The following are the principal towns, with the population of each in 1861:—

Alcester. [ALCESTER.]

Atherstone, a market town, 14 miles N. by W. from Coventry, is situated in a valley surrounded by finely wooded hills, on the Roman road called Watling Street, the Trent Valley Railway, and the Birmingham and Fazeley Canal. The town is irregularly built, and contains some ancient stone houses, several well-built churches and chapels, a free school, market-house, and manufactures of hats, ribbons, and stockings. There are four annual fairs; that held in September being one of the most considerable in England for the sale of cheese. Here the earl of Richmond (Henry VII.) conferred with the disaffected nobles of Richard III., on the eve of the battle of Bosworth Field, which lies about 5 miles distant, in the county of Leicester. One mile S. is Mancester, the site of the *Manduessedum* of the Romans, where important remains of the ancient camp may still be seen. Population, 3877.

Bedworth, a town and parish 3½ miles S. of Nuneaton, contains coal works, silk mills, and ribbon manufactories. Population of the town, 3968, and of the parish, 5656.

Birmingham. [BIRMINGHAM.]

Coleshill, a market town, and the place of election for the N. division of the county, 10 miles E. by N. from Birmingham, and 18 miles N.N.W. from Warwick, is situated on an eminence, at the foot of which the river Cole flows, and consists principally of one long street, with a number of respectable and some spacious and handsome houses. The church is built on a lofty site, and has a square western tower, with buttresses, surmounted by a crocketed spire of decorated Gothic character. It contains a font of Norman architecture, and is rich in monuments, especially of the Digby family. The river Blythe flows near the town on the east side; and in the neighbourhood is Maxstoke Castle, built by William de Chalon, in the reign of Edward III. It is now the property of the Dilke family. The ground plan is a parallelogram, with a hexagonal tower at each angle; the whole surrounded by a moat, and approached by a noble gateway. Maxstoke Priory, built in 1337 by the founder of the castle, is now in ruins. The site belongs to Lord Leigh. Population of the parish, 2053.

Coventry. [COVENTRY.]

Henley-in-Arden, a market town, 9 miles W. from Warwick, is situated at the confluence of the Arrow and the Alne, on the road from Stratford-on-Avon to Birmingham, and consists principally of one long street. The houses, though mostly ancient, are well built; and there are some of more modern date interspersed. The church is small, but of good perpendicular character, with well-executed details. The market-cross is ancient, and of good design. 'Arden' was the ancient name of the forest which formerly overspread this part of the county. Population of the town, 1069, and of the parish, 2253.

Kenilworth (*i.e.*, Kenulph's worth, or dwelling-place), a market-town, 4 miles N. from Warwick and Leamington, consists principally of one long street, extending nearly a mile along the road from Coventry to Warwick; another street leads towards the castle, and near this road is the parish church. Many of the houses are very neat; the church, dedicated to St. Nicholas, has some remains of ancient architecture, especially a fine and much enriched Norman entrance arch, in the lower part of an old tower, which is surmounted by a spire of more modern date. St. John's church is a neat substantial building, erected in 1852. There is an ancient stone bridge over a brook flowing into the Avon. But the most interesting object in the place is the castle, whose ruins are extensive. It was built by Geoffrey de Clinton in the reign of Henry I., and after having been possessed by three of his descendants, reverted to the Crown. Henry III. then bestowed it on the great Simon de Montfort, earl of Leicester, by whose son it was held during the Barons' War, as an important centre of operations. After the death of the earl at Evesham, it was besieged by the royal forces in 1218, and captured. It was next conferred upon the king's younger son, Edmund, earl of Leicester. In the reign of Edward I. it was the scene of a magnificent tournament, at which 100 knights displayed their prowess. It afterwards fell into the hands of John of Gaunt, who made large additions to the fortress. Reverting to the Crown in the reign of Henry IV., it remained a royal appanage until conferred by Queen Elizabeth on her favourite, Robert Dudley, earl of Leicester, who expended in the improvement and embellishment of the castle and its demesnes 60,000*l.*, or at the present value of money, half a million. Here he entertained Queen Elizabeth in 1566, 1568, and 1575; on the last occasion with a luxury of splendour which has become familiarized to every reader by Scott's picturesque description in his romance of 'Kenilworth.' For seventeen days the queen was entertained at a cost of 1000*l.* a day, with every variety of entertainment that the earl's fancy could devise and his wealth carry out. The castle was dismantled after the civil war of Charles I., and at the Restoration Charles II. granted Kenilworth to Lawrence Hyde, afterwards earl of Rochester, from whom it has descended, by marriage, to the Villiers family, now represented by the earl of Clarendon. The ancient abbey, whose ruins date from the same period as the castle, also belongs to this nobleman.

The principal portions of the castle, whose outer wall incloses an area of seven acres, are the gallery tower, the great gate-house, the keep or Cæsar's tower, the strong or Mervyn's tower, the great hall (190 feet long by 45 feet broad), the white hall (50 feet by 25), and the stately range of Leicester's buildings. But these massive ruins, as Scott observes, only serve to show what their splendour once was, and to impress on the musing visitor the transitory value of human possessions, and the happiness of those who enjoy a humble lot in virtuous contentment. The gateway is in good preservation, and eminently picturesque. The inhabitants of Kenilworth are principally employed in tanning and comb-making.

The town possesses some chemical works, dissenting places of worship, a grammar-school, almshouses, and a mechanics' institute. Population of the parish, 3680, and of the town, 3013.

Kington, or *Kineton*, a small town, 11 miles S. by E. from Warwick, is irregularly built, and the houses are chiefly old, of stone, and thatched. There is an old market-house. The church, which has some ancient portions amid many alterations, has a square embattled tower. The market is almost disused. The famous battle of Edgehill was fought in the vicinity. Population, 1305.

Leamington-Priors, or *Royal Leamington Spa*, 2 miles E. from Warwick, has, from a village, in about fifty years become a large, wealthy, and fashionable watering-place. It is built on both banks of the Leam, but chiefly on the northern, and occupies the bottom and slopes of a wooded valley. The surrounding country is highly picturesque, and furnishes an almost endless variety of pleasing rides and excursions, diversified by the fine residences of the Warwick, Leigh, Willoughby, and other noble families; the ruins of Kenilworth Castle, Guy's Cliff, Offchurch Bury, Stratford-on-Avon, Blacklow Hill, and other spots equally interesting to the tourist and the antiquary. It is also a fine hunting country, and is much resorted to by lovers of the chase. The main streets, crescents, squares, terraces, and parades of the town, are broad and straight, and composed of handsome mansions, villas, dwelling-houses, shops, hotels, and public buildings. The old well or spring, first noticed by Camden in 1586, has a neat pump-room erected over it. In 1786 a saline spring was discovered by Benjamin Satchwell, the village shoemaker, the curative properties of which were lauded by many eminent physicians. Early in the present century several new springs were found, and in connection with these establishments for drinking the waters or bathing (of which the royal pump-rooms, erected at a cost of 25,000*l.*, are the principal) have been formed in different parts of the town. These establishments, eleven or twelve in number, have hot, cold, vapour, shower, and Turkish baths, with every convenience for drinking the waters, but they are not used so much as formerly. The 'season' lasts from October to May, but a great many of the former visitors have become residents, and the population is not nearly so fluctuating as it was before the town had attained its present reputation. The Leamington Spa was styled 'Royal,' in 1838, with the sanction of her Majesty, who, as Princess Victoria, visited the town in 1830. The main constituents of the waters are, sulphate of soda, 35 grains; chloride of sodium, 30 grains; chloride of calcium, 23 grains; and chloride of magnesium, 11 grains, to one pint. The town contains the royal assembly rooms, a handsome building, built in 1813, at a cost of 10,000*l.*, comprehending a public library and reading-rooms, with an assembly-room above; the Parthenon, erected in 1821, at a cost of 25,000*l.*, with card, music, billiard, and refreshment rooms attached; public hall, temperance hall, free library, a proprietary college, in the Tudor style, erected in 1847; a parish church, which has been entirely reconstructed, in the early perpendicular style, since 1843; St. Mary's church, built in 1839; Christ church, Trinity church, and Milverton Episcopal chapel; numerous places of worship for Independents, Methodists, Baptists, and Roman Catholics; national schools; the Warneford hospital, founded in 1832, by Dr. Warneford; the Jephson gardens, named after Dr. Jephson, a great benefactor of the town; the arboretum, founded by Dr. Hitchman; several beautiful promenades, and a well laid out cemetery. The Warwick and Napton Canal passes through the Old Town, and the London and North-Western and Great Western Railways have stations adjoining each other. Population of the parish, 17,402; and of the town, which includes parts of the parishes of Milverton and Lillington, 17,958.

Nuneaton, a market town, 18 miles N. by E. from Warwick, is irregularly laid out, but tolerably well built. The river Anker runs through it. The church is a Gothic building, with a square tower. The free grammar school, founded by Edward VI., in 1553, has an endowed income of about 300*l.* per annum. There is also a chapel of ease, and four places of worship for dissenters. The chief branch of industry in the town and neighbourhood is the ribbon manufacture; and some cotton mills also provide employment for a portion of the population. The coal-field, which extends from Tamworth to Coventry, passes through the parish, and there are extensive coal-pits and stone quarries. Population of the township, 4645.

Rugby (anciently *Rochebyrig* or *Rochebyrie*), a market town, 16 miles N.E. from Warwick, with a station on the North-Western and Midland Railways, stands on an eminence near the south bank of the Avon, and consists of several streets irregularly laid out, containing numerous well-built and substantial houses. The importance of the town is chiefly derived from its grammar-school, founded in 1567 by Laurence Sheriff, a grocer of London, and a native of the neighbouring village of Brownsover. The school buildings form a quadrangle, inclosing a court 90 feet long by 75 feet wide, surrounded on three sides by open cloisters. The principal front, towards the south, extends 220 feet. They were erected early in the present century, from the designs of Mr. Hakewell, and are in the Elizabethan style, of white brick, with the angles, cornices, and dressings to the openings and windows of Attleborough stone. The chapel, erected since the completion of the other buildings, contains monuments to Dr. James and Dr. Arnold, head-masters of the school, to the latter of whom it owes its great reputation. Under his superintendence it rose from a comparatively decadent condition to a position of the highest celebrity, and the system which he inaugurated extended its beneficial influence far and wide. The renown of the school has been well maintained by his successors, Dr. Tait (now bishop of London), Dr. Goulburn, and Dr. Temple. The average number of boys in the school is 500, of whom about fifty are upon the foundation. The endowment now produces about 5000*l.* per annum. School life at Rugby has been admirably portrayed in Mr. Hughes' well-known fiction, 'Tom Brown's School Days.' The management is vested in twelve trustees, and five exhibitions of 40*l.* to 80*l.* per annum, tenable for four years, are given annually. Rugby church has a square western tower, without buttresses and devoid of ornament. There are several district churches of recent erection. Among the other noticeable buildings are Wesleyan and Baptist chapels, Laurence Sheriff's almshouses, the George hotel, the railway station, and Elborow's charity school. About 2 miles distant is Bilton Hall, formerly the residence of Addison. Population of the town and parish, 7818.

Solihull, a market town, 7 miles S.E. from Birmingham, consists of two principal streets, nearly parallel to each other, and of two or three smaller connecting streets or lanes. The houses are generally modern and well built, and some of them are handsome. The church, which is on the south side of the town, is a large and curious cruciform building. At Solihull were edu-

cated the poets Shenstone and Jago. Population of the parish, 3329.

Southam, a market town, 12 miles S.E. by S. from Coventry, lies in a valley, watered by a small stream which flows into the Ichene, just below the town. It contains a number of modern well-built houses. The church is of various dates; it has a western tower and spire. There are also places of worship for dissenters; a court-house, with a large hall for concerts and public meetings; and the market is well attended by the agriculturists of the surrounding neighbourhood. Large cattle fairs are also held here. Population, 1674.

Stratford-upon-Avon, a market town and municipal borough, 8 miles S.W. by S. from Warwick, is situated on the W. bank of the Avon, which is here crossed by a large stone bridge. The town slopes gently towards the river, which is a copious but sluggish stream. The town-hall, a Tuscan building, was erected in 1768. The house in Henley Street in which Shakspeare was born, April 26, 1564, has been purchased for the nation by subscription, and is in the charge of certain trustees. It has been visited by pilgrims from every civilized country. The parish church, in which he was buried, and which contains his monumental bust, executed by Gerard Johnson about 1628–30, and the graves of his wife and daughters, is large and handsome, with a central early English tower. New Place, the house in which Shakspeare resided in his latter years, was pulled down in 1759. The town contains a neat theatre. The chapel of the Holy Cross, a picturesque Gothic structure, was founded in 1269, and rebuilt in 1450. The grammar-school, where Shakspeare was educated, dates from the reign of Henry VI. There are also a market-house, almshouses, dissenting chapels, and an ancient building known as the Guild Hall. The rich pastoral scenery of the Avon valley is full of tranquil beauty, and has been commemorated by poet and artist. That it inspired the imagination of Shakspeare himself is evident from many passages in his dramas, and the characteristics of the river are vividly sketched in Act II. s. 7 of the 'Two Gentlemen of Verona.' For accurate descriptions of this classic neighbourhood the reader is referred to Charles Knight's 'Shakspeare: a Biography;' Hawthorne's 'Old Home,' Washington Irving's 'Sketch Book,' and James Thorne's 'Rambles by Rivers.' The municipal borough of Stratford, incorporated by charter in 1553, is governed by four aldermen, one of whom is mayor, and twelve councillors. Population of the township, 3672, and of the parish, 6823.

Sutton-Coldfield, an ancient market town, 8 miles N.N.E. from Birmingham, has a neat appearance, and contains some well-built houses. The church is handsome, and comprehends a nave, with side aisles and chancel, of Gothic design. The nave is modern. The town-hall is a neat brick building, founded by John Vesey, bishop of Exeter, temp. Henry VIII. South-west lies the 'Coldfield,' a bleak and cheerless tract of 13,000 acres, extending into Staffordshire; and N.W. and W. is Sutton Park, containing about 3500 acres, granted to the poor of the town as pasturage by Bishop Vesey. Population of the parish, 4662.

Warwick. [WARWICK.]

Principal Seats.—Few English counties can boast of nobler mansions or statelier 'ancestral halls' than Warwickshire. Kenilworth and Warwick castles, those noble monuments of mediæval architecture, have been described under their respective heads; but a word or two of reference is necessary to Guy's Cliff, near Warwick, scarcely less famous for its natural than its artificial beauties; Offchurch Bury, the seat of Lord Guernsey, a Tudor Gothic building; Charlecote, 4 miles from Stratford, the demesne of the Lucy family, and indissolubly associated with the memory of Shakspeare; Bagley Park, near Alcester, the seat of the marquis of Hereford; Combe Abbey, 5 miles from Coventry, an Elizabethan mansion of picturesque design, where Elizabeth, queen of Bohemia, was educated, and which is now remarkable for its valuable collection of pictures; Arbury Hall, near Nuneaton, the seat of the Newdegates; Astley Castle, about a mile from Arbury; Aston Hall, 10 miles from Birmingham, now the property of the people of Birmingham; and Stoneleigh, the beautiful seat of Lord Leigh, 2 miles from Kenilworth, situated on the site of an ancient Cistercian abbey, in a majestic and well-wooded park, which is watered by the Avon.

Worthies.—Warwickshire can boast of many names renowned in the history and literature of England. That of Shakspeare will occur to every reader. Among the 'lesser stars' are Michael Drayton, the poet of the 'Polyolbion;' William Somerville and Richard Jago, poets now but little read; Sir William Dugdale, the eminent antiquarian; Edward Cave, the founder of the *Gentleman's Magazine*; Henry Crompton, bishop of London, one of the 'seven bishops' who opposed the arbitrary designs of James II.; Fulke Greville, Lord Brooke, a graceful poet, and liberal patron of men of letters; Humphrey Wanley, the antiquary; and Sir Thomas Overbury, author of some elaborate 'Satires.' We may add that Dr. Parr, the great critic and scholar, was for forty years curate of Hatton; that Addison has made classic ground of Bilton Hall; and that James Watt spent his later life at Handsworth, near Birmingham.

History and Antiquities.—In the earliest historic period this county appears to have been occupied by two tribes, the Cornavii and the Wigantes or Wiccii, who were partially subdued by the Roman governor, Ostorius Scapula, about A.D. 50, and completely reduced by Suetonius Paulinus. A great part of it was then covered with a dense luxuriant forest. In the Roman division of Britain the shire was included in the province of Britannia Secunda. Various Roman towns and stations may be identified: of these Alcester and Mancester are the most important. Three Roman roads traverse the county: the Watling Street, the Icknield Street, and the Foss-Way. Roman coins or other antiquities have been found near Birmingham, Hampton-in-Arden, Willoughby near the Leam, on the eastern border of the county, and at Warwick; and a Roman pavement was excavated many years ago at Coventry.

In the earlier Saxon period Warwickshire, then called *Weringseyre*, formed part of the kingdom of Mercia. Under King Alfred it came, with the rest of Mercia south-west of Watling Street, under direct subjection to the West Saxon crown (about 886), and during part of the reign of Alfred and his son, Edward the Elder, it was governed by the Alderman Æthered, and after his death by his wife, Ethelfleda, Alfred's daughter. During this and the subsequent reigns it was frequently ravaged by the Danes or Northmen.

In the civil war of Charles I. the county generally embraced the cause of the Parliament, being especially swayed by the influence of Lord Brooke; and the first great battle of the war was fought in 1642 at Edge Hill, within its boundaries. Warwick Castle, the principal post of the Parliamentarians, was attacked by the Royalists in the early part of the war, but without success.

WASAIM, named from the Swedish dynasty of Wasa or Vasa, was introduced as a new metal by Bahr, of Stockholm, in 1682. In November, 1863, the chemist Nicklès declared it to be nothing but a combination of didymium, terbium, and yttrium.

WASH. [NORFOLK.]

WASHINGTON, a city in the district of Columbia, and the political metropolis of the United States of North America, is situated on the left bank of the Potomac, between that river and two of its tributaries —one called the East branch, and a smaller one, named Rock Creek—in 38° 53′ N. lat., 77° 2′ W. long. It is 38 miles S.W. of Baltimore, 226 from New York, 432 from Boston, about 2000 from San Francisco in a straight line, 122 from Richmond, and 1203 from New Orleans. There is railway communication, *via* Baltimore, with all the chief towns in the N. part of the country; and it is connected with the cities in the S. and S.W. by steamboats to Aquia Creek, and thence by the Fredericksburg, Potomac, and Richmond line. The population in 1860 was 61,122; but this number is greatly increased during the sessions of Congress, and also in the winter, when it is a favourite residence of the wealthy Americans.

Washington is nearly surrounded by an amphitheatre of hills, which were formerly covered with trees and shrubberies; but owing to its having been threatened with capture during the Civil War, from its exposed position, these heights were then strongly fortified. The site of the city was selected by the first president, George Washington, from whom it was named; and as it was originally planned on a scale of grandeur beyond what it has attained, it has in some parts rather an unfinished and disjointed appearance, but is now of very respectable dimensions, and is gradually increasing. Generally it is about 40 feet above the level of the rivers. George Town is only separated from Washington by Rock Creek, and Alexandria is 8 miles further down on the opposite side of the Potomac, over which is carried a bridge more than a mile in length—the river here being very wide, and of sufficient depth for the largest vessels, although it is nearly 300 miles from the sea. The city itself is regularly laid out in wide streets running N. and S., crossed by others from E. and W., and there are also broad avenues which traverse the rectangular divisions diagonally, radiating from the Capitol and the president's house. These avenues bear the names, and point in the direction of the fifteen original states of the Union. The finest is the Pennsylvania Avenue, which is 160 feet wide: it extends for about 1½ mile from the Capitol to the president's house, and is lined with handsome public and private buildings.

Washington is the ordinary abode of the presidents—whose official residence is generally called the 'White House'—and of the foreign ambassadors. The city plot, or ground plan, extends 4½ miles from N.W. to S.E., and about 2½ miles from N.E. to S.W., covering an area of 10 square miles, but as yet only a small portion of this is built upon. The parks, squares, and other open spaces are numerous and extensive. Many of them contain statues of celebrated Americans. The streets are distinguished by letters: the one immediately N. of the Capitol being called 'A Street North;' that to the S., 'A Street South,' and so on through the alphabet. The others, intersecting these at right angles, are distinguished by numbers: the first E. of the Capitol being '1st Street East;' the first to the W., '1st Street West,' and so on up to about thirty each way. The ground taken up by streets is greater than that devoted to buildings; most of the former being of enormous width. Many of the spaces at the intersections of the avennes and roads have been inclosed and planted, and are thus very ornamental.

The city is supplied with abundance of water by an aqueduct opened in 1863, from the Falls of the Potomac, 18 miles distant. The quantity thus brought down is estimated at 36,000,000 gallons a day. One of the bridges for this aqueduct is a beautiful piece of architecture, being of white marble with a single arch of 220 feet span—the largest in the world.

The most important of the public buildings of Washington is the Capitol, or House of Congress, which stands on a gentle elevation in the centre of the city, and is probably the finest structure in the New World. It was commenced in 1792—Washington laying the foundation stone—destroyed by the British in 1814, rebuilt in 1825, and extended in 1851. The original building is of freestone, but the two spacious wings added in the last-mentioned year are of pure white marble. There is a lofty dome in the centre, and two smaller ones at the side. The original Capitol is 352 feet long by 121 feet in depth; but by the addition of the two wings (each 238 feet by 140 feet, and connected by corridors 44 feet long) the whole building is now 737 feet long, and covers an area of 3½ acres. On the eastern side there are three grand porticos of Corinthian columns in marble; the western front, which commands the finest view in Washington, projects 83 feet, including the steps, and is embellished with a recessed portico of ten columns. In the centre is the Rotunda, a circular room 96 feet in diameter, and 96 feet high. The dome which surmounts it is of iron, and upon the top is a bronze statue of Liberty, 287 feet above the basement. In the northern extension is the new Senate Chamber, and in the southern one the House of Representatives, both similarly constructed of iron, with flat ceilings; and though more convenient for members and spectators, they are far inferior in architectural beauty to the old halls, the domed ceilings and columns of which were, however, thought to interfere with their acoustic properties. The new Senate Chamber, which is 112 feet by 82 feet, contains galleries for 1000 spectators. The Hall of Representatives is 139 feet by 93 feet, and has a gallery capable of accommodating 1200 persons. Within the Capitol are also included the Supreme Court of the United States, in the old Senate Chamber; the library of Congress, containing over 100,000 volumes and documents; a law library, in the old court room; and numerous reception, committee, and retiring rooms. The Rotunda is filled with historical paintings, by Trumbull, Vanderlyn, and other national artists; and the entire building is richly ornamented, and adorned with fine groups of statuary, frescoes, and beautiful marbles. The old Hall of Representatives is still considered the handsomest room in the edifice. The grounds around the Capitol at present comprise about 25 acres, but are to be enlarged to double that size. They are laid out in walks, and ornamented with shrubs and trees: the part immediately in front of the building is being converted into a botanic garden. The president's house, which is inclosed in a small park, 1½ mile N.W. from the Capitol, is a handsome structure of freestone, painted white, from which it is called the 'White House.' It is two stories high, with a lofty basement, and has an Ionic portico of four columns in front and three columns in depth. Near it are the treasury, army and navy offices, the general post-office, and the patent office. The building devoted to the Treasury and State departments is of an immense size, containing about 500 rooms, besides a large engraving

and printing establishment. The general post-office is a fine structure of white marble, 204 feet long, and 102 deep. The patent office, which is considered only second to the Capitol for extent and elegance, covers an entire square, and its saloons, 1300 feet in length, are filled with models of every machine or invention that has been patented. A new building for the Department of Agriculture was opened in 1868. It contains a museum in which are specimens of the animals, insects, fruits, and products of the soil from every part of the United States.

Washington also contains a city hall, several theatres, an extensive government asylum for the insane of the district of Columbia and the army and navy (which is surrounded by a large farm), an arsenal, navy yard, military asylum, six banks, numerous hotels, hospital, penitentiary, &c. In 1868 there were forty places of worship in the city, of which six were Catholic, five Episcopalian, five Baptist, seven Methodist, two Lutheran, one Friends' meeting-house, six Presbyterian, one Unitarian, one Jewish synagogue, and six for coloured congregations. Trinity Episcopal church, in the Gothic style, is one of the finest ecclesiastical buildings. The educational establishments include Roman Catholic and Baptist colleges, a flourishing national medical college, established in 1823; the Columbia College, incorporated in 1821; public schools in every ward, and a large number of academies. On the banks of the Potomac, S.W. of the president's house, is the national observatory, which is well supplied with good instruments. Near the Capitol, and in the midst of an extensive park, stands a fine building called the Smithsonian Institution, from its having been endowed by James Smithson, Esq., an Englishman, who left 100,000*l.* to the United States 'to found at Washington an establishment for the increase and diffusion of knowledge among men.' It is 450 feet long by 140 wide, is built of red sandstone, in the Romanesque or Norman style, and embellished by nine picturesque towers from 75 to 150 feet in height. In the building is a museum for objects of natural history, one of the best supplied laboratories in the United States, a gallery for paintings and statuary, and a room capable of containing 100,000 volumes, though at present there are only half that number in it. Works on ethnology and antiquities have already been published by the trustees of the institution.

Owing to its comparatively recent origin, the objects of interest in Washington are few. In the museum may be seen the printing press at which Franklin worked; and in the same room is preserved the 'Declaration of Independence.' Fifteen miles to the S., on the Potomac, is Mount Vernon, once the home, and now the tomb, of Washington. Cenotaphs are erected in the Congressional burying-ground, which is situated about a mile E. of the Capitol, to all members of Congress dying while in office; and here also have been deposited, for a short time at least, the remains of some of the most distinguished men in the nation. On the angle between the president's house and the Capitol, a colossal monument of Washington has been commenced. It is to be erected by the voluntary contributions of the people, and is intended to be an obelisk of white marble, about 600 feet high, but as yet it is only completed to 180 feet. The base is 55 feet square, and the interior will contain arched rooms for the reception of relics, &c. Every state has furnished a block of native stone or copper, which are to be inserted at each landing of the inside staircase. This structure is also surrounded with well-arranged grounds: indeed, the Capitol, the Smithsonian Institute, and the Washington monument, may all be said to be included in one vast park. Some handsome white marble edifices, on the N. of the city, are used as a military asylum; but one of them has lately been appropriated as a summer residence for the president.

The district of Columbia, in which Washington is included, comprises a circuit of 60 square miles, and is under the immediate jurisdiction of Congress. The city itself, in regard to municipal matters, is governed by a mayor and common council, elected by the people; but the citizens have no other franchise—a provision adopted in order to prevent its being the subject of periodical election excitements. The inhabitants carry on an extensive retail trade, and some of them manufacture metallic goods and glass; but the adjacent ports of George Town and Alexandria absorb most of the foreign trade. The navy yard, which is inclosed by a wall, and covers about 20 acres, is one of the most extensive in the Union, employing more than 400 hands in the manufacture of anchors, chain-cables, steam-engines, and boilers; and in brass and iron foundries, &c. Several ships of war of the largest class have been built here. The arsenal, at the junction of the East branch with the Potomac, about a mile from the navy yard, is also one of the principal arsenals of construction in the United States.

The Act for making Washington the capital of the country was passed in July, 1790, and in 1800 the government was removed thither. The population at that time was only 3210. In 1814 the city was taken by the British, when the Capitol, president's house, and library of Congress were either wholly destroyed or greatly injured by fire, and other public works defaced. In 1865 it was the scene of the assassination of President Abraham Lincoln.

WASHINGTON, GEORGE, was born in Virginia, February 22, 1732. On the death of his father in 1743, the family property was divided among his children: to George were left the lands and mansion occupied by his father at his decease.

He was educated at a common school, which he left before he had completed his sixteenth year. The last two years of his attendance had been devoted to the study of geometry, trigonometry, and surveying. He never commenced the study of the classical languages, and he appears not to have had time even to learn French. When a boy his principal attention was given to surveying, in which he distinguished himself so much that when he had scarcely completed his sixteenth year he received a commission as public surveyor.

The next three years were devoted without intermission, except in the winter months, to his profession. A considerable portion of those three years were spent among the Alleghany mountains. At the time he attained his nineteenth year the frontiers of Virginia were threatened with Indian depredations and French encroachments. To meet this danger the province was divided into military districts, to each of which an adjutant-general with the rank of major was appointed. George Washington was commissioned to one of these districts, with a salary of 150*l.* per annum. He now studied military exercises and tactic, and entered with alacrity and zeal into the duties of his office. These pursuits were varied by a voyage to Barbadoes, and a residence of some months there. After his return to his regular duties the number of military divisions was reduced to four, of which he was appointed to the northern.

In 1753, when the French began to make aggressions upon the British territory in Canada, Washington was sent by Dinwiddie, the governor of Virginia, as a com-

missioner to confer with them, and learn their intentions. In the autumn of 1755 he was appointed to reorganize the troops of Virginia. He retained the command of them till 1758, when he resigned his commission, and retired into private life.

On January 6, 1759, he married Mrs. Martha Custis, of Virginia, a young widow with two children. Her husband had left valuable estates, and a large sum in money. One-third of this property she held in her own right, the other two-thirds being equally divided between her two children. Washington had a considerable fortune of his own at the time of his marriage—the estate at Mount Vernon, on the Potomac, and large tracts of excellent land, which he had selected during his surveying expeditions, and obtained grants of at different times. He now devoted himself chiefly to the management of this extensive property. He had been elected a member of the House of Burgesses before he resigned his commission; and though there were commonly two and sometimes three sessions in every year, he was punctual in his attendance from the beginning to the end of each.

On March 4, 1773, Lord Dunmore prorogued the House of Burgesses of Virginia. Washington had expressed his disapprobation of the Stamp Act in unqualified terms. The non-importation agreement, drawn up by George Mason, of Virginia, in 1769, was presented to the members of the dissolved House of Burgesses by Washington. In 1773 he supported the resolutions instituting a committee of correspondence, and recommending the legislatures of the other colonies to do the same. He represented Fairfax county in the convention which met at Williamsburg, in August, 1744, and was appointed one of the six Virginian delegates to the first general Congress. On his return from Congress he was virtually placed in command of the Virginia Independent Companies. In the spring of 1775 he devised a plan for the more complete military organization of Virginia, and on June 15 of that year was elected by Congress commander-in-chief of the army. A few days after his appointment he left Philadelphia to join the camp at Cambridge, in Massachusetts. He reached it on the 2nd of July. The army, including sick and wounded, amounted to about 17,000 men, hastily collected on the spur of the moment, and occupying a range of posts almost under the guns of the enemy. There were few stores, no military chest, and no adequate preparation. He immediately applied himself to the work of organization, and to a vigorous correspondence with Congress, which by degrees adopted his suggestions.

The army was at first distributed into three grand divisions of two brigades each, the left being at Winter Hill, the right at Roxburgh, and the centre at Cambridge, where Washington fixed his head-quarters. These positions were maintained with little alteration till January, 1776. During that interval the American regular army sunk to 9650 men, to whom were added 15,000 militia, bound to remain only till the middle of January. Washington detached 1100 men, under Arnold, in the direction of Canada, and equipped and sent out armed vessels from the New England ports. Occasional cannonades and skirmishes took place at the advanced posts, but no decisive blow could be hazarded; and the patience of the commander-in-chief was severely tried by the cabals of the officers, the undisciplined habits of the men, and the pragmatical conduct of the civil authorities.

Towards the end of December, 1775, General Howe, who had succeeded Gage in command of the British army, equipped a part of the fleet in Boston harbour for some secret enterprise. General Lee was despatched to place New York in a state of defence, but the expedition proved to be destined against North Carolina. Washington would fain have attacked Boston, but was twice overruled by a council of war. At last, March 4, 1776, the Americans took possession of Dorchester Heights; and on the 17th the British evacuated Boston. As soon as the British fleet had put to sea Washington set out for New York; but he was obliged by the end of August to evacuate that city, cross the Hudson, and fall back behind the Delaware. Congress at last saw the necessity of raising a regular army of men enlisted for a longer period than a year, and of investing their generalissimo with full powers. Thus strengthened, he remodelled his troops, recrossed the Delaware on the night of December 25, and broke up and drove back the whole of the enemy's line of cantonments on that river. He then established his winter-quarters at Morristown in New Jersey.

The campaign of 1777 did not open till the middle of June, and was for some time nothing but a series of skirmishes. Washington, however, had received a supply of arms from France. At length the British landed on the banks of the Elk River, which flows into Chesapeake Bay. The Americans were defeated on the Brandywine, and again at Germantown in Pennsylvania, October 4. The British took possession of Philadelphia after the battle. On December 18 Washington began to construct a fortified encampment at Valley Forge. He was at this time harassed by cabals among the general officers. The winter was a trying one. He employed it in planning an entire remodelling of the troops, and in procuring for them more liberal rewards for length of service. The ratification of the treaty with France was celebrated in the camp with great solemnity, May 6, 1778. The British in Philadelphia, though only 20 miles distant from the American camp, allowed the winter and spring to pass without making any attempt to assault it. These concurring circumstances enabled Washington to bring his troops into the field in 1778 in tolerable spirits. Howe evacuated Philadelphia, June 18, and Washington crossed the Delaware with his whole army. He attacked the enemy at Monmouth on the 28th. Night put an end to the attack, and under its cover the British continued their retreat. The American general advanced to the Hudson, and crossing it at King's Ferry, encamped near White Plains. Count d'Estaing, with a French fleet of twelve ships of the line and four frigates, arrived about the same time off Sandy Hook. The American army was engaged for four months in arrangements for the defence of New England, during which interval the English laid New Jersey waste. In December it retired into winter-quarters.

During the whole of 1779 Washington held his position in the high lands of the Hudson, and remained on the defensive. Rochambeau, with a French armament, arrived at Newport, Rhode Island, July 10, 1780. A plan of combined operations against the British in New York was then concerted between the American and the French commanders. The naval superiority of the English, however, prevented anything being effected, and the year wore away unmarked by any incidents, except the treason of Arnold and the execution of Major André.

The year 1781 opened with a mutiny among the Pennsylvania and Jersey troops, which was subdued by the promptitude and self-possession of Washington. He was now strengthened not only by a French auxiliary army, but by liberal supplies from France. The main source of his weakness was the want of support from

the general government. On July 4 he encamped near Dobb's Ferry, on the Hudson, and was joined on the 6th by the French army under Count Rochambeau. Having decided to relinquish the siege of New York, he reached Lafayette's head-quarters at Williamsburg in Virginia, September 14. De Grasse, who commanded the French fleet, had previously entered the Chesapeake and landed 3000 men from the West Indies, who united with Lafayette. Cornwallis took possession of York Town and Gloucester on the opposite side of York River in Virginia. The American and French generals advanced from Williamsburg and completely invested York Town, September 30. Cornwallis proposed a cessation of hostilities, October 17, and signed articles of capitulation. The French army remained in Virginia, its head-quarters being at Williamsburg; the American forces were marched into winter cantonments in New Jersey and on the Hudson.

In the following year Washington made every possible exertion to expel the British from New York and Charleston. Meantime negotiations for peace with Great Britain were going on, whilst great discontent prevailed in the American army on account of the ill-treatment it had experienced from Congress. Having pacified the officers, Washington became their advocate with Congress, and obtained the concession of their demands. At length, on November 25, 1783, peace was proclaimed, and the British evacuated New York. On December 4 Washington took a solemn farewell of the officers of the army, and on December 23 he resigned his commission to Congress.

In 1787 the legislature of Virginia elected him their delegate to the Convention which met at Philadelphia. The Convention unanimously chose him for their president, and he assisted in framing the American constitution. On the 30th of April, 1789, he took the oath of office as the first president of the United States. Jefferson was appointed secretary of state; Hamilton, secretary of the treasury; and Knox, secretary of war. Randolph had the post of attorney-general. The appointments to the supreme court cost him much anxious scrutiny. Jay was made chief-justice. After making these appointments he undertook a tour through the eastern states, and returned to be present at the opening of Congress, in January, 1790.

The session of 1791 produced the laws for apportioning the representatives, establishing a uniform militia system, and increasing the army. It now became apparent that two great parties were in the process of formation. Jefferson was the head of the democratic, Hamilton of what was afterwards called the federalist. Washington, though leaning himself towards the latter, endeavoured to reconcile these ardent spirits. Meantime, his own term of office drawing to a close, he yielded to solicitations from all quarters, and consented to be re-elected. He took the new oaths, March 4, 1793.

The first question that came before the cabinet after his re-election rendered more decided the differences which already existed. The European parties, of which the court of St. James and the French Republic were the representatives, were eager to draw the United States into the vortex of their struggle. The president and his cabinet were unanimous in their determination to preserve peace; and they succeeded. The proclamation of neutrality was published April 22, 1793.

This wise act was bitterly assailed by the partisans of France. Washington avowed his disapproval of the violent proceedings of the Jacobins in France, and his wish for a peaceable settlement of the differences with Great Britain; and notwithstanding the opposition of the democratic party, Mr. Jay was sent on a mission to London, and the treaty negotiated by him was ratified August 8, 1795.

Washington was succeeded as president of the United States by John Adams, March 4, 1797. Except when summoned in May, 1798, to take the command of the provincial army on the prospect of a war with France, he did not again engage in public business. He died December 14, 1799, and was buried at Mount Vernon. His life has been written by Jared Sparkes, Judge Marshall, D. Ramsay, Washington Irving, and others.

WASHINGTON, TERRITORY OF, occupies the extreme N.W. of the domain of the United States of America. It is bounded on the N. by British Columbia and the Straits of Juan de Fuca (which separate it from Vancouver's Island), on the E. by Idaho, on the S. by Oregon, from which it is separated by the Columbia River, and on the W. by the Pacific Ocean. It lies between 45° 33′ and 49° N. lat., and between 116° 56′ and 124° 43′ W. long., being about 360 miles in its greatest length, from E. to W., and 235 miles in width, from N. to S. Its form is nearly a parallelogram. The area is estimated at 70,000 square miles; and the population, in 1860, was 11,594, of whom 8225 were white males, 2913 white females, thirty free coloured persons, and 426 Indians. In 1868 the number of inhabitants had increased to 14,000.

A large part of the surface is mountainous, being a continuation of the rocky chains in Oregon. The Cascade range extends across the territory in a north and south direction, dividing it into unequal portions, the larger of which is on the eastern side. The principal peaks are Mount Rainier, about 12,300 feet; Mount St. Helen; Mount Adams, about 9500 feet; and Mount Baker, 10,700 feet high. These peaks are covered with perpetual snow. Mount St. Helen and Mount Baker are active volcanoes. Between the Cascade range and the ocean rises the Coast range, the highest peak of which is Mount Olympus, about 8150 feet above the sea. In the S.E. part is a range called the Blue mountains.

The territory is drained by the river Columbia and its affluents, but the navigation of all the streams is obstructed by falls and rapids. The mountain and river scenery is very striking, and considered by some travellers to be the grandest in America. In the interior are numerous lakes, abounding in fish. The Straits of San Juan de Fuca connect the Pacific Ocean with Puget's Sound, a large bay from 1 to 4 miles wide, which penetrates nearly 100 miles into the heart of the country, and forms one of the best harbours in America. It is in the immediate neighbourhood of what are now the best whaling grounds in the Pacific, and is navigable for the largest ships, which may anchor close to the shore.

The territory contains many plains and valleys, and possesses a varied soil, but is generally well watered, densely wooded, and very fertile, especially on the lowlands along the rivers. Only a small portion has yet been brought under cultivation, but wheat, barley, oats, potatoes, and the hardier fruits are produced in abundance. The arable land W. of the Columbia River is estimated at 22,000 square miles: the E. of the Cascade range is more particularly a grazing country. At present the forests are the chief source of wealth, excellent spar and mast timber being grown here, and shipped to all parts of the globe. Among the trees is the same species of gigantic fir which is found in Oregon and California, attaining a height of nearly 300 feet, and from 8 to 12 feet in diameter. The forests around

Puget Sound comprise yellow fir, cedar, maple, oak, ash, spruce, hemlock, and alder, all very large. The wooded districts abound in game and wild animals: among the latter are the elk, deer, bear, fox, otter, beaver, musk-rat, and rabbit; and the birds include swans, geese, brant, gulls, ducks, eagles, grouse, pheasants, partridges, wood-cocks, hawks, ravens, and robins. Fish are very plentiful, especially in Puget Sound and the adjoining waters. Cod, mackerel, sardines, halibut, herring, and flounders, and the oyster, crab, clam, lobster, and many other species are found. The salmon resort to the Columbia and its tributaries in immense shoals.

Extensive mines of coal occur in many places, accompanied by new red sandstone (valuable for building); and rich veins of gold are reported to exist in two or three districts, particularly on the Columbia River.

The climate in the W. of the territory is very similar to that of England; but to the E. of the mountains extremes of both heat and cold are experienced.

Washington territory is divided into twenty-two counties, and is under the authority of a governor, who is appointed by the president, and receives 3000 dollars per annum. The local legislature is composed of a council of nine members, and a House of Representatives, numbering thirty.

In 1860 there were twelve churches, six academies, forty-six public schools, and ten libraries in the district.

The capital town is *Olympia*, a thriving port at the S. extremity of Puget's Sound, the vicinity of which is regarded as one of the best parts of the whole country. Vancouver, Seattle, Walla Walla, and other towns, with a multitude of mining villages and camps, are scattered over the territory, but none of them are at present of sufficient importance to require a detailed notice.

The district was first discovered by Juan de Fuca, a Greek, in 1592. In 1775 it was visited by some Spanish navigators; three years afterwards by Captain Cook, and subsequently by Vancouver and others. It was first settled by the Hudson's Bay Company in 1828; in 1848 the Americans entered the country, then part of Oregon; and the discovery of gold diggings at Fraser River in 1858 attracted thither 15,000 persons, many of whom became permanent residents. It was made an independent territory in March, 1853.

WASPS, the name familiarly applied in English to insects of the genus *Vespa*, of which there are several native species. The Hornet, *Vespa crabro*, is the largest, and in Britain occurs only in the southern counties, building its nest in trees, and working night and day. It passes the winter in deep holes, which it excavates in decayed trees towards the end of autumn. Of the other indigenous species, the *Vespa vulgaris* is the most common. It is a ground-wasp, as is also the *Vespa rufa*, a rarer species, making smaller nests and associated in less populous societies. Of tree-wasps we have the *Vespa holsatica* of Linnæus, which is the *Vespa Anglica* of Leach. Another British species has been described under the name of *Vespa borealis*. It lives in fir-woods in Yorkshire and in the north of Scotland.

Wasps live in societies composed of females, males, and neuters or workers, which are essentially females, but have the reproductive organs undeveloped or passive. The females are usually largest, but of them there are two sizes—one very much larger than the neuters, and laying eggs which produce two sexes, while the other is about the same size, and lays only male eggs. The larger kind are produced later than the workers, and come forth to be queens, and to found new colonies in the following spring. Destined to become the monarch of a populous state, the queen-mother is at fir cast and alone. Industry effects her greatne instinctive ambition, ere her subjects are born the foundations of the metropolis of her kingd ing the first houses herself. She then give their first inhabitants, whom she feeds and nu out assistance. 'At length,' to quote the description of Kirby and Spence, 'she re reward of her perseverance and labour, and fro solitary unconnected individual, in the autumn to rival the queen of the hive in the numb children and subjects, and in the edifice w inhabit—the number of cells in a vespiary amounting to more than 16,000, almost all contain either an egg, a grub, or a pupa, and serving for three generations in a year; whi making every allowance for failures and casua give a population of at least 80,000. Ever time, when she has so numerous an army of co the industry of this creature does not cease, continues to set an example of diligence to th the community. If by any accident, before females are hatched, the queen-mother peris neuters cease their labours, lose their instincts,

The community of wasps and their nest are vespiary. There are several hundred females these settlements, few of which survive the The survivors fly about in spring actively en preparations for their future colonies. Once est they never quit the nest. In their youth they from the pupa towards the end of August, and same time with the males. They pair in Se and October. The males are about equal in with the females. Their habits are industrious, like those of drones, luxurious and lazy. They street-sweepers and undertakers of their city. carry off the rubbish and the bodies of the dead if too heavy for their strength, they quarter and away piecemeal. Their lives are peaceful, and a natural death at the close of the year, when th destroys both them and the workers.

The neuters are the most numerous and the l class of the vespine community. They are its arch soldiers, and commissaries. They build, gather visions, regulate the nurseries, and revenge in They ramble everywhere with impunity, and all visions are to their taste. Levying contrib wherever they can, they fight for their spoil if disto Robbers and ferocious enemies of the rest of the they are faithful servants of the commonwealth of they are members. The food they collect is sh among all with impartial justice. The worker h brought home his spoil, perches on the top of the amid his assembled compatriots, and disgorges sweets he has collected, fairly distributes them. not occupied on foraging expeditions, the neuter employed in the enlargement and repair of the Celerity and order prevail in all their operations. of the masons has his allotted space, an inch or so and a half in extent, wherein he conducts his plast operations, his mouth serving as a hod, carrying of ligneous fibre, previously torn by his powerful from gateposts, wood-blocks, and neighbouring This fibre, kneaded together and moistened with is made into a paper, of which are constructed combs, each made up of a number of hexagonal opening downwards. The outside of the whole coated with foliaceous layers. The cells of the the common English wasp are brown, and

texture; but where the larvæ have spun their cocoons, they are lined with a white and semi-transparent paper, fashioned on the mould of the cell, and probably made by the larvæ themselves.

Wasps are fond of honey, but obtain it by plundering the bee-hives; and being the more powerful insects, are enabled to do so by main force. The bees, suffering from the cold in the mornings and evenings of the latter end of the season, retire into the snugger and warmer recesses of the hive among the honeycomb, when the wasps, not so delicate in constitution, take advantage of the unguarded entrances of the hive and go in to levy contributions. Running up the inside, they make for the honey, and carry away all they can. Hornets, still more impatient, attack the bees when laden with their treasures in going homewards, and carry them off as prisoners, to whom no quarter is shown. Both wasps and hornets display great sagacity when the body of the captive is too heavy for their strength, by cutting off the head and limbs to lighten the weight. [Vespidæ.]

WASSAIL, the name of a festive song, of Saxon origin, which was sung in the middle age, from door to door, about the time of Epiphany. The *Wassail Bowl* was the name of a large silver cup or bowl, in which our Saxon ancestors at their festivals drank healths to one another, agreeably to the old Saxon phrase *Waes-hael*, 'health to you.'

WASSELONNE. [Rhin, Bas.]

WASTE. The notion of waste seems to be when a tenant for years, by the courtesy, by dower, or for life, so deals with land, or such things as are attached to the soil, as to destroy them or greatly damage them. Accordingly the old action of waste lay against such tenants by him who had the immediate estate of inheritance. Waste is either *voluntary*, which is an act of commission, or *permissive*, which is a matter of omission only.

Voluntary Waste chiefly consists in felling timber trees, pulling down houses, or permanently altering any part of a house, in opening new mines or quarries, in changing the course of husbandry, and in the destruction of heir-looms.

Permissive Waste consists chiefly in allowing the buildings upon an estate to go to decay.

Tenants in tail, as they have estates of inheritance, may commit every kind of waste; the meaning of which is, that they can do those acts to the land which tenants who have not an estate of inheritance cannot do. Tenants in tail after possibility of issue extinct are not impeachable for waste; but like tenants for life when their estates are given without impeachment of waste, they may be restrained from wilfully destroying the estate. Copyholders cannot, unless there be a special custom to warrant it, commit any kind of waste; and every species of waste not warranted by the custom of the manor operates as a forfeiture of the copyhold.

The writ of waste, originally given by the statute of Marlbridge, 52 Henry III. c. 24, was abolished by the 3 & 4 Will. IV. c. 27, s. 36. By the 3 & 4 Will. IV. c. 52, s. 2, remedies by action of trespass or trespass on the case are given against the executors of any deceased person for any wrong committed by him in his lifetime against the real or personal property of another within six months of his death, provided the action be brought within six months after the personal representatives have taken upon themselves the administration of the estate.

The most complete remedy in cases of waste is by application by bill to the Court of Chancery, which will not only direct an account to be taken and satisfaction to be made for the damage done, but will interpose by way of injunction to restrain the commission of future waste.

It has long been usual when estates for life are expressly limited, to insert a clause declaring that the tenant shall hold the lands 'without impeachment of waste.' These words enable him to cut down timber and to convert it to his own use; but he may be restrained in equity from committing malicious waste so as to destroy the estate, or cutting down timber which serves for shelter or ornament to a mansion-house, or timber unfit to be felled. This is what is called the doctrine of Equitable Waste.

Ecclesiastical persons, who hold lands in right of a church, are disabled from committing waste, though, like other tenants for life, they have the right to take from the land materials for necessary repairs. The Court of Chancery can grant an injunction against any ecclesiastical person to stay waste in cutting down timber, pulling down houses, or opening quarries or mines on the glebe.

In Scotland the term *waste* is not recognized in law. The remedy is in an action of interdict to prevent injury, or by an action of damages to recover loss sustained thereby.

WATCH. [Horology.]

WATCH, among seamen, is the period of time occupied by each part of a ship's crew alternately while on duty. The period of time called a *watch* is four hours, the reckoning beginning at noon or midnight. Between four and eight P.M. the time is divided into two short or *dog-watches*, in order to prevent the constant recurrence of the same portion of the crew keeping the watch during the same hours. Thus the period from twelve to four P.M. is called the afternoon watch, from four to six the first dog-watch, from six to eight the second dog-watch, from eight to twelve the first night-watch, from twelve to four A.M. the middle watch, from four to eight the morning watch, and from eight to twelve at noon the forenoon watch. When this alteration of watches is kept up during the twenty-four hours it is termed having *watch and watch*, in distinction from keeping all hands at work during one or more watches.

WATCH AND WARD, the ancient custom of watching by night and warding or keeping the peace by day in towns and cities, a duty that was imposed upon every inhabitant in turn.

WATCHET. [Somersetshire.]

WATER (symbol, H_2O_2; equivalent, 18; specific gravity, 1) is, in a state of purity, a clear, transparent, colourless, and inodorous liquid, which, at different degrees of heat and cold, undergoes surprising transformations. At a temperature above 212° it evaporates in steam, which, contrasted with air at the same temperature, has a specific gravity of 0·625. In this vaporized condition it consists of two parts of hydrogen and one of oxygen. [Steam.] At a temperature below 32° it freezes, passing into a hard and solid mass of crystals, whose forms are all referrible to the six-sided prism and the rhombohedron. [Ice.] But though water gradually dilates below 39°, its refractive power on light continues to increase.

Its density at 60°, and at the sea-level, is represented by unity, or 1·000, and taken as the standard of comparison for all solids and liquids; just as hydrogen serves as a standard for gases and vapours. Distilled water is 815 times heavier than air, and a cubic inch weighs, in air at 62° Fahr., and with the barometer at 30 inches, 252·458 grains, and *in vacuo* 252·722 grains, the grain = $\frac{1}{7000}$ of the lb. avoirdupois.

Water was formerly considered to be an element, which could be converted into certain organic substances, and this opinion held its ground until near the close of the last century, when Cavendish by a series of ingenious experiments, in 1781, demonstrated its exact chemical composition. He came to the conclusion that water consisted of dephlogisticated air (or oxygen) united with phlogiston (or hydrogen), and a similar conclusion was arrived at by James Watt, and by the French chemist, Lavoisier. The attention of the former was directed to the subject by the account of Cavendish's experiments which he received from Dr. Priestley, and the latter was stimulated by a similar account derived from Dr. Blagden. Attempts have most ungenerously been made to deprive Cavendish of the honour of his great discovery, and fix it either upon the Frenchman or the Scotchman. But Dr. George Wilson, in his 'Life of Cavendish,' and Dr. Whewell, in his 'Inductive Sciences' have successfully controverted these claims, and proved that all the credit should fairly be given to the great English philosopher.

Water is, in fact, an oxide of hydrogen. If decomposed by electro-chemical agency it resolves itself into two parts of hydrogen and one of oxygen; while, on the other hand, if these gases be mixed in the same proportion, and fired by the electric spark, they again combine, and produce their weight of water.

Water, however, is an extraordinary solvent, and owing to its capacity of absorption is never found absolutely pure in nature. By the application of heat this property is greatly augmented, so that a hot aqueous saturated solution, if allowed to cool, will deposit a portion of the matter with which it has been charged. It dissolves a vast variety of material, from the hard rock to the elastic gas, and there are few products which can resist its continuous action.

All natural water, therefore, is more or less impure; that is, contains more or less of foreign matters. These foreign matters may be either gases, mechanical, mineral, or organic, and one or the other class will predominate according to the locality in which it is found. The purest form of water is rain water, after a continuance of wet weather, when the atmosphere has been thoroughly cleansed; but even under such circumstances it will be charged with the atmospheric gases, oxygen, nitrogen, and carbonic acid gas. In 100 parts of water will be found from 1·85 to 2·33 parts of air. After thunderstorms it has been ascertained to be charged with a small but perceptible proportion of nitrate of ammonia, due to frequent discharges of electricity through moist air.

The variety of water second in point of purity to rain water is that of some mountain torrents and rock-bound lakes, where the soil is not easily absorbed, and the only soluble matters are those washed down by the copious rains. Then comes the water of certain springs and streams, but in truth the degree of purity is always to be measured by the nature of the conditions under which the water exists.

In all cases it may be purified by distillation, rejecting the first and last portions which pass over; the first, on account of their gaseous impurities; the last, because they are necessarily polluted by the saline bodies originally absorbed.

What do we mean, the reader may ask, by mechanical and organic impurities? The mineral, mechanical, or suspended impurities are those which arise from the passage of the water through or over the earth, and consist of soil, clay, chalk, sand, silica, and other absolutely insoluble compounds. These will be more or less injurious according to their character, and will not only affect the purity but the nature of the water, rendering it 'hard' or 'soft' as the case may be. Though in a certain sense impurities, because foreign bodies, they sometimes operate as filtering materials. Thus, water which percolates through sand will be divested by this medium of much polluting matter.

By organic impurities we mean animal and vegetable organisms, either living or dead, and all kinds of animal and vegetable refuse. Their presence may be detected by the colour and smell of the water, or by chemical analysis, and if allowed to decompose they render it not only unpleasant and deleterious, but even fatal to animal life. Even now people are hardly sufficiently aware of the vast importance of pure water to human health. Many of the epidemical diseases which work such havoc in our cities and towns, are almost wholly due to the bad water drunk by their inhabitants. Recent investigations have shown how intimately the spread of cholera is connected with this subject, and have demonstrated beyond all doubt or contradiction that its ravages are not to be apprehended in districts where the water supply is of a wholesome character, where the water is reasonably free from organic impurities. Much, therefore, may be learnt from the following table showing the solid constituents in 100,000 parts of various waters supplied to towns in the United Kingdom:—

WATER SUPPLY: SOLID CONSTITUENTS IN EVERY 100,000 GALLONS.

	London.				Farnham (Surrey).	Watford (Hertfordsh'e).	Liverpool (Lancashire).	Glasgow (Scotland).	Glasgow, Water obtained from Loch Katrine.	
	New River Company.	East London Company.	Kent Water Company.	Thames Ditton and Grand Junction Co.						
Carbonate of lime, . .	11·17	14·51	10·03	16·84	0·33	23·04	1·08	1·21	Peroxide of iron, .	0·343
Sulphate of lime, . . .	4·61	3·33	15·76	4·37	1·87	—	1·43	0·17	Lime, ...	0·731
Nitrate of lime, . . .	0·03	1·03	0·10	0·39	Trace.	0·33	—	—	Magnesia, ...	0·219
Carbonate of magnesia, .	1·56	2·16	4·88	1·81	0·91	1·07	0·16	—	Potash, ...	0·043
Sulphate of magnesia, .	—	—	—	—	—	—	—	0·46	Soda, ...	0·320
Chloride of sodium, . .	2·47	2·51	5·00	1·57	1·33	1·44	2·23	0·96	Chloride of sodium,	0·017
Sulphate of soda, . . .	2·13	1·34	—	—	0·10	1·87	—	—	Sulphuric acid, . .	0·060
Chloride of potassium, .	—	—	—	0·96	—	—	—	—	Phosphoric acid, .	Trace.
Sulphate of potash, . .	1·58	1·79	1·00	0·24	0·61	0·63	—	—	Carbonic acid, . . .	0·562
Iron, Alumina, Phosphates, ...	Traces.	0·67	Traces.	0·13	1·26	—	0·34	0·11	Silicic acid, ...	0·176
Silica, ...	0·71	0·89	1·08	0·89	1·41	2·27	0·21	0·20	Organic and other volatile matter, .	0·071
Organic and other volatile matter, ...	0·98	1·62	1·65	1·54	2·54	1·80	2·00	2·60		3·142
	25·24	29·85	39·50	28·74	10·36	32·45	7·45	5·71		

With respect to gaseous impurities, it is only necessary to observe that their presence in water wholly depends upon the conditions of its locality. But the waters of some springs, owing to the strata through which they pass, contain large quantities of gases—as sulphuretted hydrogen gas at Harrogate.

Mineral or saline impurities are of the most varied description, and are contracted by water in its passage through the earth or over its surface. They may be carbonate of lime, carbonate of magnesia, potash, soda, sulphate of soda, alumina, each being found in varying proportions, according to the nature of the soil. The greater proportion of the substances found in water are of a mineral character. Where iron is present, the water is said to be chalybeate. 'Hard' water is produced by the presence of the salts of magnesia and lime.

From Dr. Frankland's report to the registrar-general for 1866, we obtain the following details relative to the composition of the metropolitan water supply:—

1. *Water of Companies drawing their supplies from the Thames.*—Solid matter in 100,000 parts = 27·88; organic and other volatile matter = 1·29; amount of oxygen requisite to oxygenate the organic matter = 0·571; degree of hardness, 19·5.

2. *Water of the East Kent Company, obtained from Artesian Wells.*—Solid matter = 39·03; organic and other volatile matter = 1·34; amount of oxygen requisite for oxidation of organic matter = ·0096; degree of hardness, 26·5.

3. *Water of the South Essex Company, obtained from Artesian Wells.*—Solid matter = 38·77; organic and other volatile matter = ·0138; degree of hardness, 25·1.

4. *Water of the New River, as procured from the River Lea.*—Solid matter = 24·85; organic and other volatile matter = 1·05; amount of oxygen requisite for oxidation of organic matter = ·0268; degree of hardness, 18·4.

5. *Water of the East London Company, obtained from River Lea.*—Solid matter = 30·48; organic matter = 1·42; amount of oxygen requisite for oxidation of organic matter = ·0474; degree of hardness, 20·4.

Hard water may be softened for domestic purposes by introducing into it a small quantity of carbonate of soda, which quickly precipitates all the salts of lime and magnesia. The addition of lime water or milk of lime will have the same effect.

Mineral constituents always abound in the sea, and in those internal lakes which have no apparent outlet. Thus, the Dead Sea receives the Jordan and other tributaries, and has no mode of exit for its superfluous waters, which consequently are reduced by evaporation, leaving in suspension the saline constituents. The water of the Jordan contains 107·14 parts of solid matter in every 100,000, and the Dead Sea no less than 24,056 parts. Of chloride of calcium it exhibits 2455 parts; chloride of magnesium, 7822 parts; chloride of potassium, 1217; chloride of sodium, 12,110; chloride of aluminium, 56; chloride of ammonium, 6; chloride of manganese, 6; chloride of iron, 3; bromide of magnesium, 251; sulphate of lime, 68; nitrogenous organic substance, 12. The specific gravity of the Dead Sea water is 1·172.

Sea water contains no less than twenty-seven different elements—namely, chlorine, sulphur, bromine, iodine, carbon, magnesium, sodium, calcium, potassium, iron, fluorine, phosphorus (phosphate of lime), silver, boron (boracic acid), nitrogen (ammonia), silicon or silica, zinc, cobalt, copper, lead, manganese, nickel, aluminium (alumina), strontium or strontia, and barium or baryta. Some of these, however, occur in very minute quantities, and the general composition of the water of the ocean is sufficiently shown in the subjoined table:—

Solid Constituents in 100,000 *parts of Sea Water.*

	British Channel.	Mediterranean.
Chloride of sodium,	2805·948	2942·4
Chloride of potassium,	76·552	50·5
Chloride of magnesium,	366·658	321·9
Bromide of magnesium,	2·929	55·6
Sulphate of magnesia,	229·578	247·7
Sulphate of lime,	140·662	135·7
Carbonate of lime,	3·301	11·4
Iodine,	traces.	—
Ammonia,	traces.	—
Oxide of iron,	—	0·3
Total,	3625·628	3765·5
Specific gravity,	1·0274	1·0258

The saltness of sea water is a subject which has frequently engaged the attention of philosophical chemists, and it is one which has not been satisfactorily explained. It would seem, however, to have been acquired when our earth was in the act of subsiding from a gaseous state. Its density depends upon its proportion of saline matter, which is generally a little above 3 per cent., though it varies in different places. The ocean contains more salt in the southern than in the northern hemisphere, more in the Atlantic than in the Pacific. In the latter, the greatest proportion of salt is found in the parallels of lat. 22° N. and lat. 17° S. It is less near the equator, and least in the Polar seas, from the liquefaction of the ice. Sea water freezes at about 28° 30′ Fahrenheit.

Its limpidity is remarkable; it absorbs all the prismatic colours, except that of ultramarine, which, being reflected in every direction, imprints a hue approaching the azure of the sky. The true tint, when not exposed to atmospheric influence, is always uniform; but it changes its colour in certain localities from the presence of infusoria, vegetable substances, and minute particles of matter.

(Professor Miller's *Inorganic Chemistry*; article 'Water' in *Encyclopædia Britannica*, 9th edit.; Brande, *Dictionary of Science and Literature*; Fownes, *Manual of Chemistry*, &c.)

WATER BUG, the popular name of a section of Heteropterous insects, scientifically distinguished as *Hydrocorisæ*, which dwell almost entirely in the water, and are divided into two families, the boatfly (*Notonectidæ*), and the water scorpion (*Nepidæ*). They feed upon aquatic insects. Their antennæ are very small, and hidden beneath the eye; the anterior portion of their first pair of wings is horny.

WATER CHESTNUT, *Marron d'Eau*, the popular name of the edible seeds of the *Trapa natans* (also called the water caltrops). This is an European species of the natural order *Haloragiaceæ*, and flourishes in ponds and ditches in southern Europe. The fruit has four spines; the kernels, which are not unlike almonds, are edible, either raw or roasted, and are much used in soups. The name 'Water Chestnut' is also applied to the esculent tubers of the *Scirpus tuberosus*, a leafless plant of the order *Gyperaceæ*, much cultivated by the Chinese both for food and medicine.

WATER-COURSES. The right of conducting water through one piece of land for the use of another is an

incorporeal hereditament of the class of Easements, and was known in the Roman law by the name of the *servitus aquæ ductus*. The right of taking water out of the well or pond belonging to another person is an incorporeal hereditament of the class of profits called in the Roman law the *servitus aquæ haustus*. These rights, in our law, must be either derived from a grant or established by prescription.

The legal presumption is that the proprietor of each bank of a stream is the proprietor of one-half of the land covered by the stream; but every proprietor has a right to use the water which flows in the stream. No proprietor can either diminish the quantity of water which would otherwise descend upon the proprietors below, nor throw back the water upon the proprietors above, so as to overflow or injure their lands.

The only modes in which a right to the use of running water in a manner inconsistent with the common law rights of others can be established, are either proof of an actual grant or license from the persons whose rights are affected, or proof of an uninterrupted enjoyment of such a privilege for such a period as the law considers sufficient to constitute a right by prescription. The period of twenty years has been generally fixed upon by the courts of law and equity for this purpose, and the same period has been adopted in the Prescription Act (2 & 3 Will. IV. c. 71, s. 2). The exclusive right to a flow of water once acquired can only pass by grant as an incorporeal hereditament.

WATER CRANE, a swivelling pipe employed to supply the feeding tank of a locomotive engine with water. It derives its name from its resemblance to a crane for lifting goods, and is directed over the line of rails in such wise that the mouth of the pipe hangs above the locomotive tank, and a valve being opened, water runs into the tank from an elevated cistern at the side of the railway. Express trains on our principal railways now take up water for the engine, by an ingenious contrivance, without stopping, tanks being laid along the ground for this purpose.

WATER-CRESS. [Sisymbrium.]

WATER DROPWORT, *Œnanthe*, a genus of plants of the natural order *Umbelliferæ*, whose fruit are of an ovate-cylindrical shape, each carpel possessing five blunt convex ribs, with single vittæ in the interstices; the flowers of the circumference being on long stalks and sterile, those of the centre subsessile and fertile. There are numerous species, of which several belong to Great Britain, and are also widely spread throughout the Continent. The Hemlock Water Dropwort, or Water Hemlock (*Œnanthe crocata*), and the common Water Dropwort (*Œnanthe fistulosa*), are distinguished by their poisonous properties. They are strong narcotics, and easily recognizable by their pungent and disagreeable odour. The Fine-leaved Water Dropwort (*Œnanthe phellandrium*), the Water Fennel of the Germans, is a useful remedy in pulmonary complaints, when cautiously employed.

WATER FLEA (*Daphnia*), a genus of *Entomostraca*, of the order *Cladocera*, and family *Cladiadæ*. The best known British species, *D. neonoculus*, abounds in ponds and ditches, and obtains its popular name from its mode of natation by short springs. It feeds on minute vegetable and animal substances.

WATER-HEMLOCK. [Cicuta Virosa.]

WATER-HEN. [Rallidæ.]

WATER-LILY, the common name of several plants remarkable for their beauty, belonging to different genera of the natural order *Nymphæaceæ*. All the species of the genera *Nymphæa* and *Nuphar* are distinguish this popular name. *N. cærulea*, Blue Water-lily native of Lower Egypt, in rice grounds and canals Rosetta, Damietta, and Cairo. *N. edulis*, the E Water-lily, is found in the East Indies, in wet districts. Its flowers are small, and white or Like all the species, it has large pear-shaped which contain an abundance of starch, and they consequently used as articles of diet. *N. pubes* indigenous in the East Indies, Malabar, Molo Tranquebar, Ceylon, Java, and has been also found Waree and Acra on the western coast of Africa. T plant is called *Lotos* throughout India, and is held sac by the Hindus. Its flowers are of a beautiful whi They expand during the day and close at night, a exhale a strong odour. *N. lotus*, the Egyptian Lot is a native of Egypt, growing in slow-running strea especially in the Nile near Rosetta and Damietta, a in rice-fields during the time they are under water. has large white flowers with the sepals red at the m gins. The roots are large, tuberous, and eatable. T plant is regarded with superstitious veneration by Egyptians. [Lotus.] *N. alba*, the common white Wat lily, flourishes in ditches, ponds, and lakes throug Europe, and is abundant in Great Britain. *N. odor* Sweet-scented Water-lily, ranges in North America f Canada to the Carolinas; it is found in deep ditc and slow-running rivers.

One of the most beautiful productions of the vegeta kingdom is closely allied to the genus *Nymphæa*, has been called by Lindley, in honour of the queen Great Britain, *Victoria regia*. This splendid plant, the dimensions of its leaves, the colour, size, and grance of its petals, may deservedly be called the Q of Flowers. It is a native of Guiana, where it was by Sir Richard Schomburgk and others. It is i high state of perfection in the Royal Gardens at K at Chatsworth, and at Sion House. The Spaniards it Water-maize, and eat the seeds when roasted. leaf, when full grown, is from 6 to 12 feet in diam

WATER-MELON. [Cucumis.]

WATER METERS, for the accurate computatio the quantity of water passing through pipes, may said to date their introduction into water-works s the year 1851. Since that time their efficiency has b regularly tested, and improvements, especially in th that allow the propagation of pressure from one sid the other, have been gradually effected.

Of more modern inventions and adaptations, we n favourably notice the meter constructed by Mes Siemens & Adamson (see fig. 1, No. 1 of the Pl 'Water Meter' prefixed to this volume). This me which has received a conspicuous share of patronag a beautiful adaptation of the turbine wheel, or Bark mill. The water, first passing through a funnel i the measuring drum, and thence outwards through c vilinear channels, causes the drum to revolve more less rapidly according to the velocity with which it le the orifice. The motion thus imparted to the drum communicated to the counter above; the reducing wh being contained within a chamber partly filled with so as to insure perfect and constant lubrication. velocity of the drum (fig. 2, Plate 1) generated by reaction of the water as it leaves the orifices of channels, is regulated by drag stays or vanes attac to the measuring drum, which produce a resista increasing in the ratio of the square of the velocity, are so proportioned as to cause the drum to revolve a velocity commensurate with the quantity pas

through it. The measuring drum—formed of thin brass, strong and light, mounted upon a perfectly-balanced spindle, and so arranged as to have the minimum of friction—rides on a fixed stud, with a hard steel point working against a hard steel plate in the bottom of the spindle. This point is permanently lubricated and protected from the corroding action of the water, by filling the small chamber at the bottom of the drum with oil, from which it has no way of escape. Notwithstanding, however, the delicacy of the workmanship of these water meters, they are found to work very efficiently, and with an almost inappreciable amount of wear.

By means of a later improvement in the same invention, large quantities are registered with the smallest possible head of water, and with the slightest waste in imparting motion to the machine. This new arrangement is shown in figs. 3, 4, 5, Plate 1. The water is, in this instance, admitted from below into the drum, and the top of the aperture through which the water pours is closed, in order to oppose the return and back action of the water. Thus when an ordinary quantity of water is passing through the drum the cap or valve is raised, and revolves with a very slight amount of friction. The cap rests upon a seating, in which are two or more small helical grooves; and when a quantity of water passes through the meter, too small in volume and without sufficient pressure to raise the drum, it passes through three small grooves, and issues against the inner surface of the drum in the direction of its intended motion; and this, together with the reaction of the water on issuing from the drum, causes the drum to revolve and register an exceedingly small quantity of water. When, however, the pressure is sufficient to raise the drum, the effect of the grooves is not apparent, and the water passes through, as in the meter just described.

In figs. 1 and 2, Plate 2, we show the vertical sections of a water meter constructed by the Manchester Water Meter Company; in figs. 3 and 4, the vertical sections of an invention by Mr. Duncan, of Liverpool. Both are piston meters, with side valves, on the principle of the steam-engine. Indeed, Mr. Duncan describes his meter as a water-engine worked by pressure, in which the water was admitted alternately to each side of the piston. The pistons are packed with cupped leathers; and, altogether, the machines are both liable to the objection of considerable friction, and wear and tear of working parts. The pressure required to give motion to the machines will be seriously felt in cases where the total pressure is small. In the event of any defect which prevents the working of the machinery, the passage of the water will be at once stopped, and none can consequently pass through without registration, as it may do in some descriptions of meter. This result, though it may be advantageous to the accuracy of registration, would frequently cause serious loss and inconvenience in cases where it was absolutely necessary that the water should at all events pass on, whether the meter did or did not work correctly. These objections, of course, refer more particularly to the machines as water meters, and are not applicable to the same extent if they are considered as water-engines, in which sense Mr. Duncan, it would seem, would wish his to be considered, and for which they may be usefully employed where the pressure in the pipes is great. Their inventor, it is true, obviates the objectionable shock which is imparted by the changes of the valves and the sudden return of the piston, by cutting small arcs or hollows in the cross-head links, which permit the piston to rest during the time that the valves are moved over the cap or cover. Mr. Duncan, in short, claims for his invention the virtues of simplicity, durability, correct measurement, and facility of repair; and, indeed, the tendency of late experiments and observation has been to show that his claim is justified.

The value of a correct water meter is sufficiently conspicuous. Thus, there have been cases in which only 40*l.* has been paid for water which, when measured, exceeded 1000*l.* in value. Cases where the rent paid for the water used has not exceeded one-fifth or one-tenth of its real value, have been only too common, and are naturally the results of no measurement, or of incorrect measurement. This is the more strongly to be deprecated, since the prevention of waste in water is no very recent improvement. After the introduction of Loch Katrine water into Glasgow in 1860, the consumption rose from 15,000,000 gallons a day to 18,000,000 per diem in three months: showing an increase of 3,000,000 gallons a day in that short period. On an investigation of the cause of so excessive an augmentation, it was found that leakage from bad taps alone might be credited with, at least, a waste of 7,200,000 gallons a day. The conclusion is palpable. The avoidance of common ground taps, and the adoption of water meters, will alone lead to the prevention of so extravagant a loss. Though much has been done in this direction, much more remains to be done; a deplorable waste being complained off by the Glasgow authorities as occurring daily, even as late as last year (1867).

WATER MILL, or *Barker's Mill*, a machine driven by the reaction of water, which has lately been superseded to a great extent by the turbine. [TURBINE.] The best of the kind is known as Whitelaw & Stirratt's, in which the velocity is governed by valves applied to the apertures of efflux to regulate their dimensions, and the quantity of water passing through the machine is also controlled. These orifices are situated on the opposite sides of two revolving arms, and their velocity of rotation should approximate as closely as possible to the velocity of issuing water. The water is conducted into the horizontal revolving arms from below, through a water-tight joint, and the upward pressure of the water balances the weight of the arms. In some cases the arms have been fashioned in the form of an Archimedean spiral, but any other shape is equally effective; the main requisite being that the area of the arms shall be proportionally large in relation to that of the orifices.

WATER-OUZEL. The water-ouzels haunt the banks of clear streams, rejoicing in the vicinity of some tumbling cascade, hurrying over a rocky declivity. They plunge into the water in quest of their food, which consists of insects and small shelled molluscs.

Three species are European, and one American, viz. the *Cinclus Mexicanus* of Swainson.

The Common Water-ouzel of our islands (*Cinclus aquaticus*) is the *Merlo aquatico* of the Italians; *Merle d'eau* of the French; *Wasser-amsel* of the Germans; and *Water-crow*, *Water-piet*, *Dipper*, and *Bessy-ducker* of the British.

Geographical Distribution.—Sweden, Scandinavia, Siberia, Russia, Germany, the Alps, the Pyrenees, Holland (rare), Spain, Italy, England, Scotland, Wales, and Ireland.

Habits, Food, &c.—'As far as the fact of its submersion goes,' says Mr. Gould, 'we have ourselves many times witnessed it; but have never been able to mark unobserved the actions of the bird under water, so as to say whether it is by a powerful effort that it keeps itself submerged, or whether it is completely at its ease, as

some have asserted. The Water-ouzel is a spirited and restless little bird, full of life and activity, flitting from stone to stone along the borders of the streams; and it is especially fond of perching upon any rock that happens to be elevated in the centre of the current, where, conspicuous by its white breast, it may be observed dipping its head and jerking its tail in a manner not unlike that of the wren, at one moment pouring forth a lively twittering song (and that even in the depth of winter, when the earth is covered with snow), and at the next diving down, and rising again at a considerable distance. When so disposed, its flight is straight, low, and rapid; in fact, much like the kingfisher; and it is equally solitary in its habits. It is, however, seldom seen in the same situations as the kingfisher, the latter being a frequenter of streams which flow through a fertile country, while the Water-ouzel is peculiar to the rapid and limpid streams which descend the mountain sides and run through glens at their base.'

The food of this species consists of land and water insects and their larvæ, *Ephemeræ*, *Phryganeæ*, &c., and fresh-water testaceous molluscs. Mr. Macgillivray found in their stomachs beetles, and the animals of *Lymnææ* and *Anclyi*.

Fissures of rocks, crags, and rough stones are selected as the locality for the curious nest, which is domed, and similar, with regard to materials, to those which compose the nest of the wren.

WATER PLANTS are those which live entirely in water, or require a preponderating quantity of water as the medium of their existence. The families are found to belong to all classes into which the whole have been divided, although those belonging to the lower classes are by far the most prevalent. Many of the families of plants having the highest organization have members belonging to them which are inhabitants of the water. Of this the *Ranunculus aquatilis* is an example, in the natural order *Ranunculaceæ*. All the species of the orders *Nymphæaceæ*, *Callitrichaceæ*, *Ceratophyllaceæ*, and *Podostemaceæ*, belonging to the class Exogens, grow in water. Among Endogens the orders *Butomaceæ*, *Naiadaceæ* or *Fluviales*, *Pistiaceæ*, *Alismaceæ*, &c., consist entirely of water plants; whilst one of the largest of the few families into which cryptogamic plants are divided, the *Algæ*, consists almost entirely of plants which live in the water. [SEA-WEEDS.]

WATER-SHED (from the Ger. *wasserscheide*, 'water-parting'), is a term in Physical Geography applied to the high ground or barrier which separates the various rain basins of a country. From hence the waters are *shed*, or parted, on either hand, to fall into some great river channel, lake, or ocean. Usually the water-shed is on elevated ground, but this is not invariably the case.

WATER-SPOUT, a meteorological phenomenon of peculiar character, which is occasionally observed on land, but usually occurs out at sea. It consists of a cone-shaped pillar of condensed vapour which descends, with the apex downwards, from a dense cloud, and at sea attracts a somewhat similar cone, in a reversed position, from the surface of the water. The two may not inaptly be compared to a gigantic hour-glass. Occasionally they unite, and their junction seems to be always accompanied by a flash of lightning, but more frequently they are carried along the sea until they disperse. If wind prevails the upper column assumes an oblique direction; in calm weather it preserves its vertical position. It is customary for ships to effect its dispersion by firing a gun. The cause of this phenomenon is supposed to be, the gyratory movement of the air with such swiftness as to produce a vacuum in the axis of rotation; the contact of the lower extremity of such an axis with water would effect the elevation of a column of the [illegible] to a height of about 30 feet. Mrs. Somerville, in her 'Physical Geography' (vol. ii., p. 47), supplies the following explanation:—'The water-spouts so frequently seen on the ocean,' she says, 'originate in adjacent strata of air of different temperatures, running in opposite directions in the upper regions of the atmosphere. They condense the vapour, and give it a whirling motion, so that it descends tapering to the sea below, and cause the surface of the water to ascend in a pointed spiral till it joins that from above. When a water-spout has a progressive motion, the upper and under parts must move in the same direction, and with equal velocity; otherwise it breaks, which frequently happens.'

WATER TABLE, in Architecture, a projection or horizontal set-off in a wall, so placed as to direct the rain-water from the surface of the building. In a ship the sills of the stern cabin window are so called.

WATER WAYS, strong pieces of timber extending round the ship at the junction of the decks with the sides, and intended to prevent the water from forcing an entrance between the side of the vessel and the edge of the deck, and to check any inclination in the beams to move upwards.

WATERFALLS are conspicuous chiefly in primary and transition countries. In secondary regions they occur more rarely, and with a descent considerably more gentle. They are formed, in the shape of cataracts, by the descent of a river over a precipice more or less perpendicular; as rapids, by the swift passage of a stream over a steeply-inclined plain. In England waterfalls are comparatively rare, and when they do take place, exhibit the usual features in a very miniature manner. Ireland is chiefly represented in the Shannon, on which a rapid occurs some distance above Limerick. Inglis ranks it above the Welsh waterfalls, and considers it to exceed in grandeur the Geisbach in Switzerland. It is nearly half a mile in length, and flows through and above a grotesque combination of huge rocks and stones. In Scotland the Falls of Clyde have obtained, and deserve, some degree of reputation. They are three in number, the Stonebyres, Bonnington, and Cora Linn, of which the latter is the largest and most admired. At that point the river rushes over a declivity 84 feet in height, into a sheltered basin hollowed out of the rock, whose sides are richly clothed with wood.

Of European cataracts, the most notable is that of the Gotha, at Trolhetta, Sweden. The river glides smoothly out of a lake 100 miles long by 50 broad; gradually increases in rapidity and volume; reaches at length the precipice of 7 fathoms depth; and then, in one broad sheet, falls over with a crash, broken at a depth of 40 feet by a mass of rocks. Pouring on with fearful violence, foaming, boiling, hissing; it augments its rapidity, and rushing onward past all obstacles, issues at last into the sea. At Schaffhausen the Rhine falls 70 feet, but with its great mass of waters presents an imposing spectacle. At Tivoli the Teverone is precipitated nearly 100 feet, and is considered one of the finest waterfalls in Europe. It is surpassed in weird grandeur and sublimity, as well as in volume and rapidity, by the falls of the Velino, at Terni. This 'hell of waters' owes much to its artificial construction. In 274 B.C. Consul Curius Dentatus caused a channel to be dug to convey the waters to the river Var; and Pope Paul IV. ordered it to be still further deepened. These arrangements, combined with natural advantages, and heightened by the

effect of time upon the river bed, have tended to make it 'worth all the cascades and torrents of Switzerland put together.' Byron has pictured it in glowing verse—

'Lo! where it comes like an eternity,
As if to sweep down all things in its track,
Charming the eye with dread—a matchless cataract.'

The list of European waterfalls does not end here. The Granson, in the Alpine highlands, descends upwards of 1200 feet. At one point in its course the Orco forms a cataract of 2400 feet. This height of precipice, however, is almost nullified by the scanty quantity of water. And the defect is again apparent at the fall of Staubbach, where a small stream, descending from a height of 1400 feet, vanishes in a cloud of silver spray. We may thus briefly describe the characteristics of European rapids, as quiet beauty and comparative repose of waters; whilst for true grandeur of scenery and sublimity we must look to America, to the Western hemisphere.

We naturally turn at first to the Falls of the Niagara. The universal testimony of travellers has declared this cataract the sublimest object on the earth. European, Asiatic, rapids sink into insignificance before it. It is a spectacle which no one can behold unmoved, without an emotion of silent awe. The superfluous waters of four great lakes, themselves of the magnitude of inland seas, gather in a channel 33 miles long, and suddenly hurling themselves in one mighty flood, fall over the brink of a huge precipice with a roar audible at a distance of 46 miles—a mass of sparkling foam and spray, lit up by a thousand rainbows. In the surrounding scenery there is nothing allied to the usual accompaniments of Old World waterfalls. In Europe we are accustomed to romantic glens, their summits crowned with lofty pines, their sides covered with verdure. At Niagara there is the wondrous sheet of water, then the fall, the crash, the eddies, the stupendous roar; but that is all. The cataract itself is subdivided into two unequal portions by the intervention of Goat Island, which has a front of nearly 1000 feet in breadth. On the British side the *Horse-shoe* fall is 2000 feet across, and 149 feet 9 inches high. The American fall is 1140 feet in breadth, and 164 feet high. The former, however, is far superior in sublimity to the latter.

The amount of water rolling over these falls has been estimated at 670,250 tons per minute. And as a circumstance of geological interest, it is noticeable that the cataract is annually receding higher up the river; that through the erosion of the rocks it is changing its position at the rate of 3 feet per year, or, according to one authority, of 150 feet in forty years. In 35,000 years the Falls will probably have retired to Lake Erie, a distance of 25 miles. Niagara is often the scene of fatal accidents and hair-breadth 'scapes. Tradition tells us of an Indian, who, involved in the vortex of the current, resigned himself calmly to his fate; threw himself down in his canoe, as if to court repose, and was swept swiftly down the precipice. Another stoic of the woods, becoming convinced that his fate was inevitable, burst out into a savage war-song, and with the words upon his lips, passed over into the gulf below. Chateaubriand, the famous Frenchman, narrowly escaped immersion in the Falls. He repaired to the scene with his horse's bridle twisted round his arm. A rattlesnake stirred among the bushes, and the horse, startled at its appearance, reared, and fell back on the abyss. Chateaubriand, unable to disengage his arm, was dragged backward. The horse, still retreating, had thrust his hind legs over the precipice, when, astonished at this new danger, it sprang forward, with a sudden effort, to a distance of 10 feet from the gulf, and saved itself and rider from a fearful death.

America abounds in waterfalls. On the St. Lawrence River both the Coteau du Lac and the Cedars are very majestic.

WATERFORD, a county in the province of Munster, in Ireland, is bounded S. by St. George's Channel, E. by the estuary called Waterford Harbour, by which it is separated from Wexford, N. by Kilkenny and Tipperary, and W. by Cork. The greatest length E. to W. is 50 miles; the greatest breadth N. to S. is 30 miles. The area is 721 square miles, or 461,553 acres, of which 325,345 are arable, 105,496 uncultivated, 23,408 in plantations, 1525 in towns, and 5779 under water. The population in 1861 was 134,252, only 3208 of whom were Protestants of the established church, 107,225 being Roman Catholics, the remainder Protestant dissenters.

Surface and Geology.—The coast line is bounded W. by Youghal Harbour, E. by Waterford Harbour, and intermediate are Tramore Bay and Dungarvan Harbour. With the exception of Waterford Harbour, these inlets are neither safe nor commodious, the coast line having generally a very inhospitable appearance, and in some parts it is very dangerous. The general character of the surface is mountainous, but towards the E. it is low and marshy. The climate is moist. The great mountain tract, called the Knockmeledown range, which extends from Waterford, on the east coast, to Dingle Bay, on the west, comprehends the whole of the county: it is interrupted on a line from Dungarvan to the valley of the Suir, west of Clonmel, by the southern extremity of the great plain that occupies the central part of Ireland. The Cummeragh mountains, to the west of Dungarvan, are among the highest and wildest in the country: the height of Monavallagh is 2598 feet above the sea. The hills contain two varieties of slate: the old transition slate, coloured gray, which is extensively used for roofing, and the newer slate, which rests on the older; the lower portions of its strata consist of alternating beds of brownish-red quartzose conglomerate and coarse red slate. The valleys are occupied by limestone, and there is a clay-slate district, which contains several copper mines, some of which are very productive. Lead and iron mines have also been worked, but with little profit. Marble of several colours, and some of it very beautiful, is quarried near Cappoquin; and potter's clay is found near Dungarvan.

Rivers.—The Suir, which rises in Tipperary, after being joined by the Nier, from the Cummeragh mountains, forms the boundary line between Waterford and Tipperary and Kilkenny. The united waters of the Suir and Barrow form the estuary called Waterford Harbour. The river is navigable for large vessels up to Waterford city, and to Carrick-on-Suir, in Tipperary, for those the draught of which does not exceed 11 feet. The Blackwater, which rises in the Kerry mountains, enters the county on the west, and runs due east to Cappoquin, where it turns southward, and discharges itself into Youghal Harbour, after receiving the river Bride about midway. It is navigable for vessels of 100 tons to its confluence with the Bride, and for those of 70 tons as far as Cappoquin.

Agriculture, &c.—Waterford is the first dairy county in Ireland, the chief occupations of its population being pasturage and dairy farming. The soil is naturally poor. Tillage is increasing, and agriculture improving on the larger properties. The Irish cow is the general dairy stock; but some of the best English varieties have been introduced by gentlemen and large farmers. Most of

the sheep are of a large and coarse breed. Great quantities of butter and bacon are exported. There are some cotton and linen manufactures at Portlaw, and the shipping trade is somewhat extensive. Fish abound on the coast.

Divisions and Towns.—Waterford is divided into eight baronies. It is in the united bishopric of Cashel, Emly, Waterford, and Lismore; and in the Leinster circuit, the assizes being held at Waterford. It sends in all five members to Parliament—two for the county, two for the city of Waterford, and one for the borough of Dungarvan. The number of county electors at the time of the last return was 3477.

The following are the principal towns, with the population in 1861:—

Cappoquin, 9 miles N.W. from Dungarvan, stands on the E. bank of the Blackwater. It is prettily situated, and consists chiefly of one street. Population, 1798.

Carrickbeg, 14 miles W.N.W. of Waterford, is a suburb of Carrick-on-Suir, in the county of Tipperary, with which it is connected by a good stone bridge. Population, 1477.

Clonmel. [CLONMEL.]

Dungarvan, a parliamentary and municipal borough, 25 miles S.W. from Waterford, is situated on both sides of the estuary of the small river Colligan, at its entrance into the bay called Dungarvan Harbour. A good stone bridge of one arch connects the two portions of the town. The streets are mostly narrow. There is a market-house, a town-hall (a fine structure, with a granite front), a national bank, a church, and two Roman Catholic chapels, two convents, a monastery, sessions-house, and an ancient castle, used as a barracks. Vessels of not more than 250 tons can discharge at the quay. The chief exports are grain, butter, cattle, and fish. Dungarvan is governed by a board of fifteen town and harbour commissioners, who have recently improved the port. The parliamentary borough returns one member. Population, 8614, many of whom are engaged in the hake, cod, and herring fisheries. The number of registered electors in 1866 was 270. Dungarvan has been greatly improved of late years by the duke of Devonshire, who has much property in the town and county, and it has now altogether a very neat and clean appearance. It is resorted to during the summer for sea-bathing. There are some remains of an Augustinian abbey, founded in the seventh century (the suburb of the town on the other side of the river is called Abbeyside), and a portion of the walls built by King John—who also erected the castle, yet in use—are still standing.

Lismore, 15 miles W.N.W. from Dungarvan, is beautifully situated on the S. bank of the Blackwater, 3 miles from the point where that river changes its course from E. to S. near Cappoquin. It is joined here by the Owenshad, a rapid stream. A handsome bridge, the centre arch of which has a span of 100 feet, crosses the main river a little above the point of junction, and leads to the city, which occupies the summit of the southern bank. This bridge was erected by the late duke of Devonshire. At the eastern extremity of the town is the cathedral, a handsome building, with a tower and spire. It is in the later English style, and was chiefly built by the earl of Cork in 1663. There are also a large Roman Catholic chapel, Presbyterian meeting-house, a court-house, grammar-school, bank, almshouses, dispensary, &c. This town has likewise been much improved by the late and present dukes of Devonshire. It has little trade beyond a salmon fishery, though there is a canal from here to the point where the Blackwater becomes navigable. The castle, a magnificent pile, originally erected by J John in 1185, and greatly enlarged and strengthene the first earl of Cork, stands on the summit of a r bank, which rises to the height of nearly 100 feet a the Blackwater. It is now in the possession of Devonshire family, by whom it has been greatly impr and embellished, and is kept in a state of com repair. This castle and an estate surrounding it fo part of the grant made to Sir Walter Raleigh. ancient see of Lismore was joined to that of Wate in the time of Edward III., and is now included in united diocese of Cashel, Emly, Waterford, and Lis The local affairs of the town are regulated by commissioners. The philosopher Boyle and the Congreve were born here. Population, 2089.

Passage, a village on the east side of Wate Harbour, intermediate between the entrance of the e ary and the city of Waterford, from which it is 6 m distant, stands opposite to a roadstead where hund of large vessels may anchor in safety. It is irregul built on a rocky height, and has a pier and block-ho Population, 852.

Portlaw, 8 miles W. by N. from Waterford, is si ated on a small affluent of the Suir, which affo excellent water power, and drives the water-wheels extensive cotton factories. These factories owe the establishment to the enterprise of a single family, Ma comson, who have raised Portlaw from an insignifica village to a flourishing little manufacturing town, an provided schools and other institutions for the social an moral improvement of the operatives in their employ and their children. Population, 3915.

Tallow, a market town, 17 miles W. from Dungarva stands about half a mile distant from the S. bank of th Bride. It is a decayed-looking place, and contains church and a Roman Catholic chapel. Population, 1427.

Tramore, a small bathing town, 6 miles S. from Waterford, stands on the W. side of Tramore Bay. It has a church and Roman Catholic chapel. Population 1802. Tramore bay is an inlet between two bold headlands, and is dangerous to shipping.

History and Antiquities.—The Menapii, a Belgic colony, appear to have been the ancient inhabitants of Waterford and the adjoining county of Wexford. The Desii, from the county of Meath, were a powerful tribe at the period of the English invasion, when their importance was nearly destroyed, and the county afterwards became the great stronghold of the English in Ireland. In 1171 Henry II. granted the city of Waterford and the adjacent province to Richard Le Poer, the marshal, and by marriage the estates and honours of the descendants came to the Beresford family, who still retain large possessions in the county. Waterford suffered little during the rebellion in 1798.

Many remains of antiquity are found in the county. At Ardmore is one of the round towers, and there are in several localities interesting and ancient intrenchments, earthworks, barrows, and cromlechs. A large double trench, called by the Irish 'the trench of St. Patrick's cow,' may be traced for 17 or 18 miles across the Blackwater towards Ardmore. A second trench runs westward from Cappoquin into Cork. At one period there were twenty-four religious establishments existing in Waterford, and the ruins of some of them still remain at Mothill, Dungarvan, Stradbally, and Lismore. The ancient castles and fortified places were also numerous.

WATERFORD, a county of a city, municipal and parliamentary borough, and the capital of the county of Waterford, 97 miles S.S.W. from Dublin, with rail

it is connected by three different lines of railway, in 52° 15′ N. lat., 7° 7′ W. long., is situated on the S. side of the Suir, and is connected with its suburb of Terry-bank on the N. side of the river, by a wooden bridge of thirty-nine arches and 832 feet long, which opens in one part to allow vessels to pass. The city is about a mile in length. A noble quay with floating stages that rise and fall with the tide, extends more than a mile along the bank of the river, from which the town rises gradually. The situation is very fine, and the streets are now generally well built, although a few are still dark, dirty, and mean-looking. The principal public buildings are the Roman Catholic cathedral, an elegant modern structure; the bishop's palace, which is of hewn stone, with a double front; the Protestant cathedral, two parish churches, five Roman Catholic chapels, three convents, and five or six places of worship for dissenters. The other public buildings are a court-house, town-hall, custom-house, chamber of commerce, theatre, city and county prisons, and district lunatic asylum. There are also a Roman Catholic college, and several good schools and charitable institutions. In the town are two breweries and four foundries; and in the neighbourhood are several flour mills.

The harbour of Waterford is formed by the channel of the Suir, from the city to its confluence with the Barrow, and from thence by the joint estuary of these rivers to the sea, a distance of 15 miles. The entrance, which is 2½ miles wide, is well lighted by a bright fixed light on Hook Tower, 139 feet above the sea, by a red light on Dunmore pier, 46 feet high, and two leading lights at Duncannon. Vessels of 2000 tons can discharge at the quays. The navigation is continued on the Suir by barges to Clonmel, and on the Barrow by sailing vessels to New Ross, and thence by barges up that river to Athy, and up the Nore to Inistiogue. On the Kilkenny side of the river there is a shipbuilding yard, with patent slip, graving bank and dock.

The exports—which are valued at 4,000,000*l.* annually—are chiefly to England, and are almost wholly agricultural, comprising bacon, pork, butter, eggs, grain, flour and meal, cattle, sheep, and pigs. The gross produce of the customs duties in 1867 was 77,838*l.* The number of vessels registered as belonging to the port in that year was 172 (35,848 tons). The entries in 1866 were 2009 (452,606 tons), and the clearances 1244 (328,156 tons).

The municipal borough is divided into five wards, and is governed by ten aldermen, of whom one is mayor, and thirty councillors. The parliamentary borough returns two members. Population of the city, 23,293; the number of voters in 1866 was 1082.

Waterford is chiefly celebrated as having been the landing place of Henry II. in 1171, when he received the submission of the Irish chieftains, and for its resistance to Perkin Warbeck, the Pretender, in the reign of Henry VII.

WATERGLASS, the name given to a liquid mixture of sand (silex) and one of the alkalies, as potash or soda. A similar compound is mentioned by Glauber, in his treatise *De Lithiase*, as early as 1644. The modern inventor, Dr. Von Fuchs, published an account of his process in 1825, and Mr. Frederick Ransome, of Ipswich, in ignorance of the German discovery, patented a mode of preparing waterglass in 1845, which he has since very considerably modified and improved. In 1857 M. Kuhlmann, of Lille, issued a pamphlet, in which he advocated the employment of waterglass to protect porous stone from the effects of the atmosphere, and also in stereochromy. Von Fuchs died at Munich on the 5th of March, 1856. His memoir, and Kuhlmann's treatise, were translated and printed in English in 1859, by direction of the late prince consort. As a substitute for fresco, waterglass has since been very successfully employed in the cartoons of the new Houses of Parliament, as, for instance, in Maclise's Death of Nelson, and Meeting of Wellington and Blucher on the Field of Waterloo.

The process of wall-painting in waterglass is as follows:—The wall is first prepared with Portland cement and sand, and then covered with an *intonaco*, or thin coat of fine plaster, containing three parts of fine sand (composed of carbonate of lime) and one of cement; the whole being very evenly worked by the mason with a wooden hand-float. As soon as the wall is properly hardened the design may be traced, but the wall should be moistened immediately before painting. The colours are applied mixed with distilled water; not heavily or in any great body, says Brande, but thinly hatched over the surface. As soon as the picture is finished it is *fixed* by an application of the waterglass from a syringe made expressly for the purpose, called a *sprinkler*.

The waterglass is generally prepared by boiling silica with caustic alkali under pressure, about 60 lbs. to the square inch, in a digester. In a pure and solid state it resembles glass, and is slowly soluble in boiling water.

WATERLAND, DANIEL, D.D., an English theological writer of repute, was born on the 17th of February, 1683, at Waseley, in Lincolnshire, of which parish his father was the rector. He completed his education at Magdalen College, Cambridge, and having taken the usual degrees with great credit, was admitted into orders, and in 1713 appointed to the rectory of Ellingham by the earl of Suffolk. He had already obtained a reputation for judicious scholarship and sound acquirements, which was confirmed, if not extended, by his first work, published in 1717, 'Advice to a Young Student, with a Method of Study for the first Four Years.' This little unpretending manual contains much excellent advice, of a truly practical character, and might advantageously be reprinted.

In 1717 Dr. Waterland was appointed one of the royal chaplains, and he soon afterwards entered upon that career of theological controversy by which he is chiefly remembered. Having written in support of Bishop Bull's 'Defence of the Nicene Creed,' he was severely assailed by a Dr. Whitby, to whom he replied very fully, in 1719, in his 'Defence of Christ's Divinity;' a work which provoked the hostile criticism of the Arian school, but which is characterized by grave argument and sound learning. In 1721 he was promoted to the rectory of St. Augustine, in the city of London, and in 1724 to the chancellorship of York Cathedral. In the same year he issued his well-known 'Critical History of the Athanasian Creed.' In 1727 he was made a canon of Windsor; shortly afterwards, was removed from St. Augustine's to the rich incumbency of Twickenham, and appointed archdeacon of Middlesex.

To enumerate all his theological works in defence of the Trinity and the sacrament of the Eucharist, and in opposition to the Arians and freethinkers, would be tedious and unprofitable. His 'Sermons,' his 'Review of the Doctrine of the Eucharist,' and his 'Scripture Vindicated,' are those on which his fame depends. But a complete collection of all his writings, with a prefatory memoir by Bishop Van Mildert, was issued from the Oxford University Press in 1823–28. Their author died on December 23, 1740.

WATERLOO, a village in Belgium, situated in an undulating plain, 12 miles from Brussels, is famous to all time for the great battle which decided the fortunes of the first French empire, and gave peace to Europe for nearly half a century. It is almost unnecessary to remind the reader that Napoleon, after his return from Elba, was formally declared an outlaw by the principal European powers (March 13, 1815); to the manifesto in which he was thus solemnly cut off from the European confederacy, England, Russia, Prussia, Austria, Sweden, Spain, and Portugal giving in their adhesion. And a treaty was afterwards concluded by which the same powers pledged themselves to a general armament, and to carry on the war until Napoleon should again be driven from the throne of France.

They lost no time in making the needful preparations. Already, on the 5th of April, the duke of Wellington [WELLINGTON, DUKE OF] arrived at Brussels to take the command of the British army, and of the contingents furnished by the Dutch, Belgians, and Hanoverians. The Prussian troops were rapidly concentrated at Aix-la-Chapelle, under Marshal Blucher [BLUCHER], to co-operate with Wellington's army, the whole forming the vanguard of the Allied hosts.

Prince Schwartzenberg [SCHWARTZENBERG] was instructed to collect 130,000 Austrians and 124,000 Germans for the 'army of the Upper Rhine;' and 168,000 Russians, under Barclay de Tolly, were assembled to compose the 'army of the Middle Rhine.'

On the other hand, Napoleon, with equal promptitude, was engaged in organizing the whole military strength of the French empire. The artillery was enlarged and improved; the cavalry augmented and remounted; the imperial guard once more called into existence. With such rapidity were his preparations completed that a splendidly efficient army was ready to take the field early in June, and Napoleon, leaving Paris on the 12th, arrived at Avennes on the 14th. He had determined, with his usual confidence in himself and his 'star,' to take the offensive, and to attack the Anglo-Belgic army before the Allies could bring up their supports. It was his hope to beat them in detail; by rapidity of movement and audacity of attack neutralizing their great numerical superiority.

At this time, uncertain where the blows of their formidable adversary might fall, the lines of the Allies were considerably extended along the French frontier, namely, from Liege to Tournay. The Prussians occupied the banks of the Sambre and the Meuse, from Liege on their left to Charleroi on their right; the Anglo-Belgians spread from Charleroi on their left to Tournay and Courtray on their right, covering the important position of Brussels.

Napoleon resolved to direct his attack upon Charleroi, with the view of separating the Prussian and Anglo-Belgian armies, and then assailing each with a superior force. Early on the 15th of June his troops were put in motion, and in three columns advanced upon Charleroi. At three o'clock on the same day Wellington received intelligence of their movements, and calling in his detached corps, directed his whole army towards Quatre Bras, so as to be ready to support Blucher, who had concentrated the Prussians at Ligny. He reached Quatre Bras early on the 16th with an advanced division of 7000 men, and found himself confronted by the left wing of the French army, under Marshal Ney, consisting of about 16,000 infantry, 7000 cavalry, and thirty-eight guns. The engagement that ensued was fought with great obstinacy on both sides, but the French were unable to make any impression on their resolute opponents; and the British Guards coming up about half-past six, Wellington was enabled to establish himself on the hard-contested field, and preserve his communications with Blucher. The Prussian commander, meanwhile, engaged with the French right and centre, under Napoleon, had suffered a heavy defeat, and, with a loss of 13,000 men, had been forced to retire upon Wavre. Here, however, he quickly reorganized his troops, and receiving large reinforcements, was, as we shall see, fully prepared by the 18th to resume operations, when Napoleon supposed him to be hopelessly beaten and demoralized.

The victory of Quatre Bras cost the British 320 killed and 2155 wounded. In all, the Allies had 3750 put *hors de combat*. The French acknowledged a loss of 4200 killed and wounded, and were reluctantly compelled to fall back upon Frasnes.

The retreat of the Prussian army also rendered it necessary for Wellington to abandon the ground so gallantly won, and he sent word to Blucher that he should concentrate his troops upon Mont St. Jean, and there accept a general battle with the French, if the Prussian general would assist him with 25,000 men. To this Blucher readily assented, and in the course of the 17th the Anglo-Belgian forces were drawn up on the plain of Waterloo, covering the road to Brussels.

The battle-field may be roughly described as a valley, or hollow, of irregular width, bounded north and south by winding ridges of low hills, which extend for some 2 or 3 miles, and gently slope, but with frequent undulations, towards the central valley. In the rear of the northern ridge, and almost in its centre, stands the village of Mont St. Jean; in a similar position behind the southern ridge is that of La Belle Alliance. Through both these villages, and consequently traversing the valley almost at right angles, runs the broad paved high road from Charleroi, which winds afar under the green boughs and through the beechen shades of the forest of Soignies to Brussels. Near the entrance to the forest is situated the little hamlet of Waterloo.

The Allied army, on the memorable 18th of June, was stationed along the northern ridge of hills, and in front of Mont St. Jean, from which position the battle frequently takes its name in the narratives of French historians. It lined a country road running parallel with the crest of the hill, and communicating with Wavre by Obain and Genval. Drawn up in two lines, the first stretched from the heights above the château of Hougoumont to the hills overlooking Papelotte and La Haye. It was wholly composed of infantry in columns, flanked on the left by two brigades of light cavalry. On the ridge above Hougoumont stood, with serried ranks, the British Guards. The château, a plain stone mansion, surrounded by a small orchard and a slender wall, was occupied by the light companies of the Guards, and the wooded inclosure by Nassauers and Hanoverian sharpshooters. The second line of the British consisted entirely of cavalry, except on the right, where Wellington posted some masses of infantry to protect his flank. And as he apprehended an attempt on the part of the French to force a passage to Brussels through Mons and Hal, a corps of observation of 18,000 men were placed at Hal, under Prince Frederick of the Netherlands, who did not come into action at all on the 18th. It is only necessary to add that a farm-house, known as La Haye Sainte, situated on the Brussels road, was garrisoned by a battalion of the German legion.

The right of the Anglo-Belgian force was under the

command of General Lord Hill; the cavalry under that of Lieut.-general the Earl of Uxbridge (afterwards Marquis of Anglesea); the left wing, under the prince of Orange; while the reserve was commanded by Wellington in person.

The strength of the Allies, at the commencement of the battle, has been variously estimated, but the best authorities place it at 67,655 men, with 156 guns.

We must now glance at the position occupied by the French, who, flushed with their victory at Ligny, and full of confidence in their great commander, arrived on the field in the course of the 17th. They, too, were disposed in two lines, extending along the southern ridge of hills, with their centre resting upon the farm-house of La Belle Alliance, on the Charleroi and Brussels road, and its right upon the village of Frichemont. In the rear of the right wing stood the church and hamlet of Planchenoit. The first line consisted of seven divisions of infantry, posted in double lines, with an interval of 75 yards between each, and a corps of cavalry on either flank. In the second line a corps of heavy cavalry, glittering with plumes and cuirasses, was also posted on each flank, while the centre was strengthened by a corps of infantry, and two divisions of horse, drawn up on either side of La Belle Alliance. The reserves included the picked veterans of the famous Imperial Guard, in three bodies—the Old, the Middle, and the Young Guard; with their chasseurs and lancers on the right, and their grenadiers and dragoons on the left.

The total French force mustered 71,947 men (infantry, 48,950; cavalry, 15,765; artillery, 7232), and 246 guns. Napoleon's chief superiority lay in his splendid cavalry and artillery.

It may here be stated that the emperor, at the outset of the battle, stationed himself on a gentle ascent in the rear of the farm-house of La Belle Alliance. There he remained, it is said, for a great part of the day; dismounted, pacing to and fro, with his hands behind him, receiving communications from his aides-de-camp, and issuing instructions to his lieutenants. As the issue of the battle became doubtful, and his dreams of a restored empire began to fade away, he approached nearer the scene of action, and manifested a more than usual degree of impatience and excitement. At three o'clock he was on horseback in front of La Belle Alliance; and in the evening, just before he directed the final charge of his Guard, he had advanced to a hollow close upon La Haye Sainte. Wellington, on the other hand, took up his position at first on the right of his centre, but during the day he rode from point to point, constantly under fire, but giving his orders and encouraging his troops with his wonted imperturbability.

The battle began about half-past eleven on the morning of Sunday, June 18, 1815. It was Napoleon's design to crush the British left and centre by a simultaneous attack, with the view of forcing that part of their position, and occupying the high road to Brussels. Meanwhile, as a diversion, he ordered a powerful division of infantry, under Prince Jerome Bonaparte, to carry the post of Hougoumont.

The latter movement was made with great vigour under cover of a tremendous fire of artillery. The French soon scattered the Nassauers and Hanoverians, and gained the inclosures. They thought the post was won, but now began the real struggle. A wave of flame spread along the garden-wall, and a storm of bullets crashed into their midst So tremendous was the fire that in half-an-hour the French lost 1150 men. Constant reinforcements, however, being pushed up, they

contrived to hold the wood, and pressing forward to the garden-wall, gallantly strove to escalade it. Another body, on the left, drove back the British companies on that side into the farm-yard, so that their bayonets soon flashed all around the beleaguered château. Throwing themselves upon the hastily barricaded gate, they drove in the timber, and poured into the court-yard. Met, however, by an awful fire and by British steel they retreated, and the gate was again closed. So surged and eddied the great fight round this apparently insignificant position, where a handful of British heroes kept at bay an entire French division.

The attack upon Hougoumont was accompanied by a formidable assault on the Allied left and centre. It was delivered by infantry and cavalry, with incomparable vivacity, but availed nothing against the steadfast resolution of the British, who met their enemies with a terrible volley, and then followed it up by the bayonet at full charge. It was at this time that Sir Thomas Picton received his death-wound. His fall was fearfully avenged by his soldiers, who sent back the French across the plain, staggering and reeling in utter confusion, and with a loss of between 2000 and 3000 killed and wounded.

Meanwhile, a desperate contest raged around the farm-house of La Haye Sainte. The buildings were set on fire by the shells, and still its gallant defenders, 500 Germans, under a British major, opposed themselves firmly to the waves of infantry that rolled ceaselessly upon their shattered defences. It was impossible for Wellington to spare them any reinforcements, and yet they held their ground. Thrice they were attacked by overwhelming masses; thrice they repulsed them, and with the butt-ends of their muskets when their ammunition failed. The French swarmed upon the roofs, and in the court-yards; and the defenders, reduced to a few score, could hold out no longer. 'No quarter was given,' says a military writer, 'and the remnant of the brave riflemen were bayoneted on the spot. This was, however, the only point where, during the long and sanguinary conflict, Bonaparte succeeded. He became master of a dilapidated dwelling, its roof destroyed by shells, and its walls perforated by a thousand shot-holes; and when obtained, an incessant torrent of grape and shrapnels, from the British artillery on the heights above, rendered its acquisition useless for future operations, and made his persistence in maintaining it a wanton and unnecessary sacrifice of human life.'

About one o'clock p.m. Napoleon ordered a second attack, under Marshal Ney, on the left centre of the British. At this time he had received information of the arrival of the Prussian advanced guard within 3 miles of his right, and had been compelled to despatch a corps of infantry and his cavalry reserves to hold them in check. It became, therefore, an urgent need that the British lines should be driven back, and for this purpose, after a tremendous cannonade from two and seventy guns, he sent forward Ney with 28,000 men, supported by a strong body of cavalry. The attack was as unsuccessful as its precursor. The French were forced to retreat, and retreating were cut up by the British horsemen, who, however, advancing too far in the eagerness of pursuit, exposed themselves to severe loss from the counter-attacks of the French cavalry.

About four o'clock the Prussians, under Bulow, having driven back the French infantry, advanced against Planchenoit, in the rear of the French right, and, after a hot struggle, carried it. The Young Guard, however, speedily re-captured it, and forcing Bulow to recede, covered for a brief period the flank of the Imperial

army. But another Prussian corps, under Ziethen, was now advancing by Obain to join the Allied left, and Napoleon saw that a crisis was at hand. Every attempt to occupy Hougoumont, or penetrate the Allied centre (though weakened by the precipitate and disgraceful flight of the Belgian troops) had failed. In the latter, Ney had remorselessly sacrificed all his cavalry—15,000 of the finest troopers the world had ever seen. Yet the British squares had scarcely been broken; thinned in numbers, but constant in spirit, they still maintained their ground.

Napoleon resolved on a final effort against these impregnable infantry, whose steadfastness had defeated all his dispositions, and excited his astonishment. He directed against it in succession two massive columns, one composed of four battalions of the Middle Guard, and the other of four battalions of the Middle and two of the Old Guard, supporting them with flank assaults from other infantry and cavalry.

In order to avoid the murderous cannonade with which the emperor covered the advance of his magnificent reserves, the British soldiers laid down, in a line four deep, behind the crest of the hill. Meanwhile, every gun that could be collected was opened with destructive effect, at 50 yards distance, upon the advancing column, who were afterwards literally swept down the slope by the sudden charge of the British Guards. Down the blood-red hill-side, heaped as it was with horse and rider, dead or dying, they poured irresistibly, a torrent which the intrepid Ney in vain attempted to stem, a torrent which carried everything before it. The Old Guard were brought up, but in vain. The British bayonets dealt with them severely, and their disorganization was completed by the rapid attacks of the British cavalry. They made no further effort to retrieve the day.

It was now eight o'clock. Ziethen and his Prussians had joined the left of the English line, which for nine hours had endured a struggle of unparalleled magnitude, and whose steadfast intrepidity had at length defeated the headlong ardour of the enemy. To convert the defeat into a rout was now the object of Wellington, and he immediately ordered a combined charge on the retiring masses of Napoleon by his whole effective force. The duke rode forward with the foremost, though shot and shell still played across the field. An officer of his staff begged of him not to expose a life so precious. 'Never mind,' he replied, 'let them fire away. The battle is won, and my life is of no consequence now.' The battle *was* won, and the French army, in a military sense, had ceased to exist. The last square of the Guard held its ground to cover their emperor's flight, but it was quickly surrounded, and on Cambronne's blunt refusal to surrender, cut to pieces. The carnage was awful; the confusion beyond all description. Baggage, artillery, ammunition, waggons—every kind of military store and equipment fell into the hands of the conquerors. No less than 227 guns were captured, besides two eagles, 267 ammunition waggons, and 7800 prisoners. In killed and wounded the French lost between 20,000 and 25,000; the exact number has never been ascertained. Nor was the loss of the Allies much less severe. The British total of killed amounted to 2924, of wounded to 6831. The Prussians lost 6990 killed and wounded; the Germans and Dutch, about 7000. Probably we may estimate the Allied loss, in round numbers, at 23,000; the French, including prisoners, at 32,000.

In concluding our brief notice of this memorable victory, we must shortly refer to some of the criticisms which it has elicited. Wellington has been censured for accepting battle at Waterloo. But he had every reason to calculate on receiving assistance from the Prussians in four hours; and as he held his ground for nine, it is evident that he had fully prepared himself for the worst contingencies. The Prussians were delayed by the state of the roads, bad weather, and other obstacles; otherwise the battle would have been earlier decided, and with less loss. As it was, the French were defeated before their arrival, which, as we have said, converted that defeat into a total rout. No manœuvres were attempted by either commander. Napoleon confined himself to his favourite operation of hurling an overwhelming force upon a particular point; but his columns shattered themselves in vain upon the British squares, like waves against a rock, and fell off from those 'walls of steel' in scattered spray. Wellington's policy was one of patience; to hold his ground until the Prussians came up, and while his antagonist spent his strength in fruitless efforts. But if the Prussians had not made their appearance, the victory would still have been his. Napoleon had sacrificed his cavalry, wasted his reserves, and had no reinforcements within reach. The disaster would only have been put off until the following day.

(To enumerate a tithe of the works which, in English, French, and German, have been devoted to an examination of the Battle of Waterloo, would be impossible in our limited space. Those which we ourselves have consulted, and which we should be disposed to recommend to the historical student, are—Brialmont and Gleig's *Life of the Duke of Wellington*; Captain Siborne's *History of the War in* 1815; Jones' *Battle of Waterloo*; Maxwell's *Victories of Wellington*; *The Wellington Despatches*; Alison's *History of Europe*; Sir Edward Creasy's *Fifteen Decisive Battles*; Sherer's *Military Memoirs*; *Quarterly Review*, Nos. cxliii. and clxxviii.; General Count Müffling's *Passages from My Life and Writings*; Earl of Ellesmere's *Essays in History, Biography, &c.*; Hooper's *Story of the Battle of Waterloo*; Colonel Leith Hay's *Narrative*; Davenport Adams, *Memorable Battles in English History*; and in French, the able and impartial essay by Colonel Charras.)

WATERPROOF COMPOSITIONS. Textile fabrics, of whatever character, are pervious to water from two causes, namely, the existence of minute spaces between the individual fibres of the yarn, whether of silk, cotton, wool, or flax; and the rectangular meshes consequent on the process of weaving. To close up these minute channels, as likewise the pores of leather, so as to impart a waterproof quality to the material, has been the object of a large number of patents, as well as of recipes which have not been patented. Mr. Hellewell, of Salford, took out one of the earliest of these patents, which, for a quantity of woven material equal to 1000 lbs. weight, consisted of a solution of alumine formed from 120 lbs. of rock alum, 80 lbs. of common whiting, and 200 gallons of water. After saturation in this, the cloth is passed quickly through a vessel containing a solution of yellow soap in water, the latter process being for the purpose of fixing the alumine in the interstices, and enabling it to resist the action of the water. It is finally washed to free it from any impurities. Mr. Hall, of Doncaster, patented a method of waterproofing cloth by immersion: one solution described consisted of alum, white-lead, and water; another of the same ingredients, with the addition of acetic acid; and the cloth, after being steeped in one of these, was passed through a solution of quick lime, and a third time through one of boiled Irish moss, which acts as a mucilage.

The surface application of a species of varnish has been the subject of many patents. A composition was introduced for this purpose many years ago, formed of linseed oil, pipeclay, burnt umber, white lead, pounded pumice-stone, and one or two other substances. This was not intended as a waterproof composition for ordinary clothing, but rather for tarpauling, awnings, coach-top covers, boat-cloaks, and other coarse materials. Mr. Newberry's patent was for a mode of applying waterproof composition in such a way as to leave one side of the woven fabric free from its influence, thereby presenting to the eye a texture nearly resembling that of ordinary cloth. His method consisted in saturating the cloth with the waterproof composition, and exposing one surface only, in such a way that the atmosphere, or artificial heat, hardened the composition on that surface into a dry membranous film; while the other side, after being kept moist during the drying of the first, was cleansed from the composition by means of spirit of turpentine.

The application of a layer of cement, gum, or varnish between two other substances, with a view to render the inner one impervious to water, has been practised under many different modifications, including that which is known by the name of the inventor, Macintosh. Mr. Weise, of Bermondsey, devised a peculiar kind of fabric, which consists of fibrous materials spun into yarn. This is dipped in caoutchouc solution before weaving; and in order to render the meshes impervious to water, the cloth is drawn over a heated cylinder, whereby the composition is so far melted as to flow into them. The Macintosh waterproof is made by applying a layer of dissolved caoutchouc to cotton or other cloth. The fabric is stretched upon frames and brushed over with it; and the surfaces of two such pieces, while in a partially damp state, are laid one upon another, and pressed between rollers till they firmly and inseparably unite. The double piece thus produced is wholly impervious to water, and is at the same time free from any adhesive substance on the surface.

The useful application of air for beds, cushions, seats, and similar articles, is dependent on the formation of air-tight cases; and this air-proof quality is brought about by nearly the same means as waterproofing. When the quantity of air included in an envelope is greatly increased, it may be made the means of producing actual pressure in a more equable way than by any solid bodies. Thus, an air-tight bandage, so formed, is often used in surgical operations.

The attempts to render leather waterproof depend in general on the filling up of the small pores which have previously admitted the tannin, the substance imbibed being such as will repel or resist water. Many such compositions have been proposed at different times, of which it will be sufficient to mention the more important. Melt over a slow fire a quart of boiled linseed oil, a pound of mutton suet, three-quarters of a pound of yellow bees'-wax, and half a pound of common resin, or smaller quantities in the like relative proportions; and with this mixture saturate the leather of new boots or shoes, while the latter is slightly warm. Another method is to melt two ounces of yellow bees'-wax, two ounces of Burgundy pitch, and two ounces of turpentine, in a pint of linseed oil, and with this mixture to saturate the warmed leather. The *Journal of the American Institute* gives the two following:—1. Boil together for half an hour one quart of linseed oil, two ounces of resin, and half an ounce of white vitriol, to which add four ounces of spirits of turpentine and two ounces of white oak sawdust, and apply this mixture to the leather by means of a brush. 2. Apply a coating of tallow to the leather; and after this has dried, coat it again with a mixture of one part of copaiba balsam with two of naphtha. Another mixture for this purpose consists of six ounces of caoutchouc boiled for two hours in two quarts of linseed or neat's-foot oil. Lastly, a mode has been much recommended of applying a hot mixture of two parts tallow and one part resin, with which the leather may be completely saturated, the resin imparting an antiseptic quality to the tallow. One of Mr. Sievier's contrivances is for rendering leather at once elastic and waterproof. A thin sheet of it is cemented to another of solid caoutchouc by a caoutchouc solution, and kept under pressure for five or six days. The compound fabric thus formed is nearly inelastic, because the leather has temporarily suspended the elastic power of the caoutchouc; but by the application of a temperature about equal to 180° Fahr., the latter partially collapses, and the former assumes a corrugated surface, similar to Morocco leather. Having been thus rendered elastic and waterproof, it is manufactured into boots and shoes or other articles.

The use of woollen cloths which waterproofing has also rendered impervious to air, has been found very disadvantageous. To avoid this inconvenience, and at the same time to secure the waterproof quality, a plan has been adopted of dipping the cloth into a solution of soap, and thoroughly rubbing it into the texture, after which it is saturated with alum; and both being thus decomposed, the minute openings between the fibres are sufficiently filled to exclude water. A second plan is to dip the cloth into a solution of gelatine or isinglass, and afterwards into another of galls. A process somewhat similar to tanning results, the gelatine which has pervaded the cloth being rendered as insoluble as leather by its union with the tannin of the galls. The purpose of both these plans is answered by the following simple recipe, suited for ordinary use:—Boil half an ounce of Russian isinglass in a pound of soft water till dissolved; dissolve an ounce of alum in two pounds of water, and a quarter of an ounce of white soap in a pound of water; strain these separately through linen, and then mix them all together. Heat this liquid till it simmers, and apply it with a brush to the wrong side of the cloth, on a flat table. When dry, brush the cloth lightly with water.

WATFORD. [HERTFORDSHIRE.]

WATLING STREET. [WAYS, ROMAN.]

WATT, JAMES, was born at Greenock, January 19, 1736. His father, who was for upwards of twenty years town-councillor, treasurer, and bailie of Greenock, made a fortune by trade, part of which, however, he lost before his death, in 1782.

Being of a delicate constitution, the early education of James Watt was in a great measure of a domestic character. About 1750 he amused himself by making an electrical machine. Chemistry was a favourite subject when he was confined by ill health to his father's dwelling. He studied natural philosophy in the popular treatise of S'Gravesande, translated from his 'Physices Elementa Mathematica,' and he also read works on surgery and medicine. In his sixteenth year he was apprenticed to an instrument-maker in Glasgow. At the end of three years he removed to London, in 1755, and placed himself with a mathematical instrument-maker; but in little more than twelve months the state of his health compelled him to return to Scotland.

Watt now endeavoured to settle himself in business in Glasgow; but owing to his not being a burgess, he met with opposition from the corporations of arts and trades. The university, however, offered him an asylum

within their precincts, where they permitted him to establish a shop; and they also honoured him with the title of their mathematical instrument-maker. These circumstances happened about 1757, and he retained his apartments in the university till 1763, when an event occurred to which the commencement of his invaluable discoveries may be most distinctly assigned. Professor John Anderson, who then occupied the chair of natural philosophy in the university, having requested him to examine and repair a small model of Newcomen's steam-engine, which could never be made to work satisfactorily, his sagacity led him to discover and remove the defects of this model; and he also discovered the imperfections of the machine itself, and was led to investigate those properties of steam upon which its action depended. The character of his improvements will be found in the article STEAM-ENGINE. About this time he left the college and took up his abode in the town previous to his marriage with his cousin, Miss Millar, in the summer of 1764.

His wife being the daughter of a freeman, he was now enabled to open a shop in the Salt Market, Glasgow, where he continued to make improvements in the steam-engine; and where, in addition to his employment as a mathematical instrument-maker, he devoted much time to the practice of land-surveying. He afterwards adopted the profession of a civil engineer. In 1768 he found in Dr. John Roebuck an individual capable of appreciating the value of his inventions, and sufficiently enterprising to support him in further experiments. The assistance of this gentleman enabled him to construct an engine, for which he obtained a patent, January 5, 1769.

In the summer of that year, however, the mining speculations of Roebuck involved him in such embarrassments that he was compelled to abandon the experiments with the new motive machine, and Watt himself was obliged to return to his former avocations of engineer and surveyor. While engaged in the latter part of 1773 in surveying a line of canal between Fort William and Inverness, since executed by Telford under the name of the Caledonian Canal, he received intelligence of the death of his wife; and he soon afterwards accepted an invitation from Matthew Boulton, the founder of the celebrated establishment at Soho, near Birmingham, to settle in England.

Boulton, to whom Dr. Roebuck transferred his share in the property of Watt's invention, was a man eminently qualified to bring it into operation. Their connection commenced early in 1774, and they remained in partnership until 1800, when Watt retired from business; but their friendship continued undiminished until Boulton's death.

At the latter end of 1774 Watt completed at Soho his fourth model engine, which was exhibited to a deputation from the Cornish miners and other persons competent to judge of its performances, and were deemed highly satisfactory. Perfect, however, as was the action of the improved machine, the patentees knew that much remained to be done to bring it into extensive operation. They therefore applied to Parliament for an extension of the term of their patent; and although the application was met by a violent opposition, occasioning great expense and anxiety to the patentees, it was ultimately successful, an Act being passed in 1775 (15 Geo. III. c. 61), 'vesting in James Watt, engineer, his executors, administrators, and assigns, the sole use and property of certain steam-engines, commonly called fire-engines, of his invention, described in the said Act, throughout his Majesty's dominions,' for a period of twenty-five years from the passing of the Act. Being thus secured a return for their outlay, the patentees prepared for the manufacture of steam-engines upon the most extensive scale, and with a degree of accuracy never before obtained in the production of large machinery.

Of the spirited manner in which Boulton conducted the mercantile department of the great adventure some idea may be formed from the fact, that upwards of 47,000*l.* was spent before the patentees received any return; but at length their remuneration began to pour in, and in no scanty stream. They were put, however, to great expense by legal proceedings against infringements of their patent, and in defence of the patent itself. At length, after a series of trials extending from 1792 to 1799 a unanimous and clear decision was given, fully vindicating and establishing the rights of the patentees.

In 1794 the sons of Messrs. Boulton & Watt were admitted to the partnership, and on the expiration of the extended term of his patent, in 1800, the latter resigned his share of the business to his two sons, and retired into private life.

As there were several scientific men residing about Birmingham who were on terms of intimacy with Watt and his partner, an association was formed under the title of the 'Lunar Society,' the members of which met monthly on the night of the full moon, for the purpose of social converse. At one of these meetings, according to Arago, a suggestion was thrown out which led Watt to the invention of the useful little machine known as the copying press, for which he obtained a patent. Towards the latter end of 1786, on a visit to Paris, undertaken at the instance of the French government for the purpose of suggesting improvements in the Machine de Marly, Watt became acquainted with Berthollet, whose method of bleaching with chlorine he brought to this country, and introduced, with certain improvements of his own, in the bleach-works of Mr. Macgregor, near Glasgow, whose daughter he had married in 1775.

Concerning Watt's share in the discovery of the composition of water, an investigation in which he, Cavendish, and Lavoisier were engaged about the same time, we must refer those who are curious to Arago's Life of, or 'Eloge' upon Watt, and to the 'Historical Account of the Discovery of the Composition of Water,' by Lord Brougham.

One of the last of the projects to which this able man devoted his attention after his retirement from business was a machine for copying sculpture, with which he proceeded so far as to execute several specimens. He kept its construction strictly secret; but when he had proceeded sufficiently with his design to contemplate obtaining a patent, he found that another person in his neighbourhood was engaged upon a similar plan. A proposal was subsequently made for obtaining a joint patent, but Watt was unwilling, at so advanced a period of life, to embark in such an undertaking.

About 1790 he had purchased an estate called Heathfield, near Soho, where he resided to the end of his life; and he held also a property on the banks of the Wye, in Wales. It is related that, when upwards of seventy, he imagined his intellectual faculties to be on the decline, and accordingly determined to put them to the test by undertaking some new study. Having selected the Anglo-Saxon language for this experiment, he mastered it with a facility which proved that there was little ground for his fears. He died August 25, 1819, in his eighty-third year.

Of the private character of the great engineer a most pleasing account is given by Lord Jeffrey, who, after stating that, independently of his great attainments in mechanics, he was an extraordinary, and in many respects a wonderful man, observes, 'Perhaps no individual in his age possessed so much and such varied and exact information—had read so much, or remembered what he had read so accurately and well. He had infinite quickness of apprehension, a prodigious memory, and a certain rectifying and methodizing power of understanding, which extracted something precious out of all that was presented to it. His stores of miscellaneous knowledge were immense, and yet less astonishing than the command he had at all times over them.'

In acknowledgment of his invaluable services it was intimated to Watt a few years before his death, that 'the highest honour usually conferred in England on men of literature and science was open to him, if he expressed a wish to that effect;' but while he felt flattered by the intimation, he determined to decline it. He became a member of the Royal Society of Edinburgh in 1784, of that of London in the following year, of the Batavian Society in 1787, and in 1808 a correspondent of the French Institute; and in 1814 the 'Académie des Sciences' of the Institute elected him one of its eight foreign associates. In 1806, by a spontaneous vote, the University of Glasgow conferred upon him the honorary degree of LL.D. In 1824 a subscription was entered into for a statue, which was sculptured by Chantrey, and is now in Westminster Abbey. Another statue by Chantrey adorns an elegant chapel erected by Watt's only surviving son, at the parish church of Handsworth, near Birmingham, in the chancel of which he was interred. Statues have also been erected in George Square, Glasgow, and in Glasgow University. (Muirhead's *Life of James Watt;* Smiles' *Lives of Boulton and Watt.*)

WATTEAU, ANTOINE, was born at Valenciennes in 1684. He went to Paris in 1702, with a scene-painter, and was subsequently employed as a copyist. From this condition, however, he was soon rescued by Claude Gillot, an artist of some ability, who took him into his house, and employed him to assist him in his works. Gillot painted landscapes, with grotesque figures, fauns, satyrs, &c., and the pupil soon surpassing the master in his own style, the latter forsook painting and adopted engraving. Watteau now acquired reputation rapidly: he was appointed peintre de Fêtes Galantes du Roi, and was elected a member of the French Academy of Painting. In 1718 he came to England, where he remained a year. He returned to Paris in a very weak state of health, and died at Nogent in 1721.

WATTS, ISAAC, the eldest of nine children, was born at Southampton, July 17, 1674. His father, who kept a boarding-school in that town, was a man of strong devotional feeling and a rigid nonconformist. The child showed a taste for books at a very early age, and imbibed under his parents those mental tendencies which prompted his determination to become a dissenting clergyman.

He was sent to the free grammar-school of his native town in his fourth year. In his sixteenth year he removed to an academy in London, kept by Mr. Rowe, the minister of an Independent meeting-house. He returned to his father's house in 1694, and spent the next two years of his life in private study.

In 1696 he was invited by Sir John Hartopp, of Stoke Newington, to undertake the tutorship to his son. The first outline of the work afterwards published under the title of 'Logic,' was prepared during this period for the use of his pupil.

Watts preached his first sermon on the day on which he completed his twenty-fourth year, July 17, 1698. In the same year he was chosen assistant to Dr. Chauncy, pastor of an Independent church in London; but he continued to reside and discharge his duties in Sir John Hartopp's family till 1702, when he succeeded Dr. Chauncy in the pastoral office. Soon after his entrance upon this charge he was seized with a dangerous illness, which left him with a constitution greatly impaired. His health returned gradually, and he performed his duty, with the help of an assistant, till 1712, when he suffered from a severe attack of fever, and never entirely recovered from its effects.

This illness excited the lively sympathy of all his friends. Foremost in all kind offices was Sir Thomas Abney, who invited him to try the effect of change of air at his house at Theobalds. Watts accepted his invitation, and went there intending to stay only a single week, but remained until his death. In 1728 he received from Edinburgh an unsolicited diploma of D.D.

His usefulness among his flock was in no wise diminished by his residence at Theobalds. When he was incapable of public labour, he refused to receive his salary; and at all times a third part of his income was devoted to charitable uses. The seasons when indisposition incapacitated him from public duty were spent in literary composition. He died November 25, 1748.

The following are the most important of his publications:—'Logic; or, the Right Use of Reason in the Inquiry after Truth,' published in 1725; 'The Improvement of the Mind,' an expansion of Locke's 'Conduct of the Human Understanding;' 'Psalms and Hymns;' 'Divine Songs attempted in easy Language for the Use of Children.' His theological works are very numerous. His 'Three Dissertations relating to the Christian Doctrine of the Trinity,' and 'Nine Sermons preached in the years 1718–19,' published in 1812, with a preface by Dr. Pye Smith, may be taken as fair specimens.

WAVE-OFFERING, in the Old Testament, an offering which the priest 'waved' when he held it aloft, as a sign that it might be eaten by the worshippers, while such as were 'heaved' the priests retained for their own use.

WAVELLITE, so named after Dr. Wavell, its discoverer, is a hydrated phosphate of alumina, which generally occurs in small crystalline concretions, either hemispherical or globular in shape, and radiated in structure. It is found at St. Austell in Cornwall, Barnstaple in Devonshire, and other localities.

WAVES. The transmission of a wave through a mass of fluid consists in the travelling onward of a certain shape of its surface and arrangement of its particles. The particles themselves do not travel steadily onward: in rolling waves they oscillate or revolve about centres which are not far from their respective positions of repose; and in 'waves of translation' they perform curved movements of limited extent.

The most obvious appearance presented to the eye by the waves of the sea is the onward travelling of a series of parallel ridges and furrows which are of equal, or nearly equal size, and of a serpentine shape in profile. The tops of the ridges are called *crests;* the furrows between them, *troughs;* and when the trough of a wave is spoken of as having a definite level and position, the lowest part of the hollow is meant.

The height of a wave is measured from trough to crest. The greatest height which has yet been accurately measured in the open sea, is about 43 feet.

The level of still water is not exactly midway between the crests and the troughs; for the crests, being of a more peaked form than the troughs, rise somewhat more above that level than the troughs sink below it.

By the *length* of the waves of a series is meant the distance, measured in the direction of advance, from crest to crest, or from trough to trough. The greatest length which has yet been measured is about 560 feet.

By the *period* of a wave is meant the time that it takes to advance through a distance equal to its length: which is also the time occupied by a particle of water in making one revolution in the orbit to be presently mentioned.

It is sufficiently evident from the appearance of the surface of the water, that its particles, during wave-motion, move up and down through a vertical distance equal to the height of a wave. An inspection of the movements of floating bodies shows further, that the particles also move backward and forward through a horizontal distance, which is in some cases equal to, and in other cases greater than, the extent of their vertical motion; and that those movements are combined in such a manner, that each particle of water revolves in a vertical plane, in an orbit which in deep water is a circle, and in shallow water a flattened oval. The centre of the orbit is somewhat above the position of the particle in still water. A particle in the trough of a wave is moving backwards; on the front slope, upwards; on the crest, forwards; on the back slope, downwards.

Figs. 1, 2, and 3 are examples of the orbits of particles of water in waves, as observed by the brothers Weber, and published in their treatise on waves called 'Wellenlehre.' Fig. 4, copied from the same work, shows the mode of motion of the particles of waves near the surface of deep water, as deduced by the same authors from observation. The straight arrow represents the direction in which the waves advance; the dotted circles are the orbits of the surface particles; the plain curved line is the profile of a wave at a given instant; the curved arrows represent the motions of the particles during one-sixth of a revolution; and the dotted curve represents the profile of the wave in its new position, at the end of that sixth of a revolution of the particles; being one-sixth of a wave-length in advance of the former position.

Fig. 1. Fig. 2. Fig. 3.

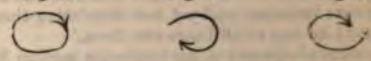


Fig. 4.

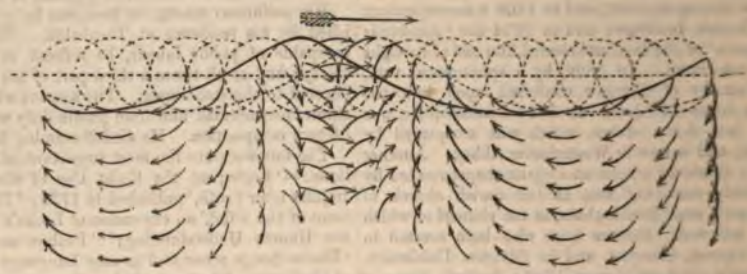
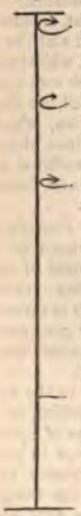


Fig. 5.



The velocity of revolution and dimensions of the orbits of the successive layers of particles below the surface diminish in going downwards; and the extent of vertical motion diminishes more rapidly in going downwards than the extent of horizontal motion.

Fig. 5, also from the Webers' work, illustrates this; showing how at greater and greater depths the orbits of the particles are more and more flattened; and how at the bottom their motion is simply an oscillation backwards and forwards in a straight line.

The mean velocity of a particle of water is to the velocity of advance of the waves, as the circumference of the orbit of that particle is to the length of a wave.

If the whole mass of water, when still, be conceived to be divided into horizontal layers, and also into vertical columns, the serpentine rolling of each layer, when agitated by waves, may be compared to that of a sheet laid upon the ground and shaken up and down at one edge. The motion of the columns may be compared to the bending and swaying of the stalks in a wind-swept field of corn; with this addition, that each column of fluid becomes alternately taller and slenderer and shorter and thicker; being taller and slenderer while it is bending forwards, shorter and thicker while it is swaying back.

No wave can be continuously transmitted in which the height exceeds a certain proportion to the length. As that proportion is approached, the crests of the waves become gradually steeper and sharper, until at length they break up into foam and spray, or are made by the wind to curl over and fall forward.

Two or more series of waves may traverse the same mass of water in the same or different directions at the same time; the motion of each particle being the resultant of the several motions which it would have received from the several series of waves separately.

Waves undergo reflection at the face of a steep cliff or wall, and refraction (or change of direction) when passing from one depth of water to another. The figure of the free surface of a series of waves, as well as that of each *surface of equal pressure* by which the mass of agitated water may be conceived to be divided into layers, is governed by the general principle, that in a mass of fluid *each surface of equal pressure is perpendicular to the direction of the resultant pressure exerted by each particle that it traverses upon the neighbouring particles.* In a mass of fluid at rest, that direction is everywhere vertical, and the surfaces of equal pressure are all horizontal. In a mass of moving fluid, the resultant pressure exerted by a particle is compounded of the force of gravity, and of the re-action exerted by the particle in consequence of its motion.

Although many questions as to the motion of waves remain to be cleared up by experiment and by mathematical investigation, the laws of the motions of the more frequent kinds of waves, especially those of the ordinary ocean-swell, are known with great completeness and precision, theory having in every case been exactly confirmed by experiment. For the details of mathematical and experimental investigations on this subject, reference may be made to Professor Airy's article on Tides and Waves in the 'Encyclopædia Metropolitana;' Mr. Scott Russell's researches in the Reports of the British Association, 1844; and to papers by Mr. Stokes in the Cambridge Transactions for 1842 and 1850; by Mr. Earnshaw in the Cambridge Transactions for 1845; by Mr. Froude in the Transactions of Naval Architects for 1862; and by Professor Rankine in the Philosophical Transactions for 1862, and in the *Philosophical Magazine* for December, 1862, October, 1864, and January, 1865.

Rolling Waves in Deep Water.—By 'deep water,' in discussing the motion of waves, is to be understood water so deep, that the nearness of the bottom has no sensible influence on the form of the particles' orbits, or on the length of the wave which travels with a given velocity. What degree of smallness of such influence is to be regarded as insensible, depends on the purpose to which the results of the investigation are to be applied.

If, for example, we regard *one per cent.* as the smallest alteration in the length of a wave of which it is necessary to take account, it follows that all water of greater depth than that which produces that alteration is to be regarded as *deep water*; that is to say, all water whose depth is greater than five-twelfths of the length of a wave.

It is known by theory and by observation, that the particles of deep water affected by wave-motion revolve in vertical orbits which are exactly or almost exactly circular.

The *period* of a wave of a given length in deep water, is the same with that of a revolving pendulum whose height is to the length of the wave as the radius of a circle to the circumference. The velocity of advance of the wave is found by dividing the length of the wave by its period.

By reasoning for which reference must be made to the authorities already cited, it is proved, that the orbits of the particles diminish in geometrical progression in going downwards.

Rules and Tables for Waves in Deep Water (extracted from Rankine on 'Shipbuilding'):—

Height of equivalent pendulum in feet, = ·8154 × square of period in seconds.

Length of wave in feet = 6·2832 × eqnivalent pendulum

= 5·1233 × square of period in seconds

$$= \frac{\text{square of velocity in feet per second}}{5{\cdot}1233} = \text{velocity} \times \text{period}.$$

Velocity in feet per second = Period × 5·1233

$$= \sqrt{\{32{\cdot}2 \times \text{equivalent pendulum}\}}$$

$$= \sqrt{\{5{\cdot}1233 \times \text{length of wave}\}}$$

= Length ÷ Period.

Velocity in knots = Velocity in feet per second ÷ 1·688.

Velocity in statute miles an hour = Velocity in knots × 1·151.

Velocity of particles of water at surface

$$= \left\{ \frac{\text{Velocity of wave} \times 3{\cdot}1416 \times \text{Height from trough to crest}}{\text{Length of Wave}} \right\}.$$

The orbits and velocities of the particles of water are diminished by *one-half* for each additional depth below the surface equal to *one-ninth of a wave-length*. For example—

Depth in fractions of a wave-length: 0 $\frac{1}{9}$ $\frac{2}{9}$ $\frac{3}{9}$ $\frac{4}{9}$, &c.

Proportionate velocities and diameters: 1 $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{8}$ $\frac{1}{16}$, &c.

To find how high the centre of the orbit of a given particle is above the level of that particle in still water:

Divide the height from trough to crest by eight times the equivalent pendulum of the waves.

TABLE OF PERIODS AND LENGTHS OF WAVES IN DEEP WATER, ARRANGED ACCORDING TO THEIR VELOCITIES IN KNOTS.

Velocity. Knots per hour.	Velocity. Feet per Second.	Velocity. Statute Miles per hour.	Period. Seconds.	Equivalent Pendulum. Feet.	Length. Feet.
1	1·688	1·15	0·33	0·09	0·56
2	3·376	2·30	0·66	0·36	2·25
3	5·064	3·45	0·98	0·80	5·06
4	6·752	4·60	1·31	1·43	9·00
5	8·44	5·75	1·64	2·24	14·05
6	10·13	6·91	1·97	3·22	20·2
7	11·82	8·06	2·30	4·38	27·5
8	13·50	9·21	2·63	5·72	36·0
9	15·19	10·36	2·96	7·24	45·5
10	16·88	11·51	3·29	8·94	56·2
11	18·57	12·66	3·32	10·8	68·0
12	20·26	13·81	3·65	12·9	80·9
13	21·94	14·96	4·27	15·1	95·0
14	23·63	16·11	4·60	17·5	110·1
15	25·32	17·26	4·93	20·1	126·4
16	27·01	18·42	5·26	22·9	143·8
17	28·70	19·57	5·59	25·8	162·3
18	30·38	20·72	5·92	29·0	182·0
19	32·07	21·87	6·25	32·3	202·8
20	33·76	23·02	6·58	35·8	224·7
21	35·45	24·17	6·91	39·4	247·8
22	37·14	25·32	7·24	43·3	272·0
23	38·82	26·47	7·57	47·3	297·3
24	40·51	27·62	7·90	51·5	323·6
25	42·20	28·77	8·23	55·9	351·2
26	43·89	29·93	8·56	60·4	379·8
27	45·58	31·08	8·89	65·2	409·6
28	47·26	32·23	9·21	70·1	440·5
29	48·95	33·38	9·54	75·2	472·5
30	50·64	34·53	9·87	80·5	505·7

Rolling Waves in Shallow Water.—In shallow water of uniform depth, the orbit of each particle becomes an oval of a height less than its length, and nearly, but not exactly, of an elliptical form. The oval orbits are smaller, and also more flattened, the nearer the particles are to the bottom: the particles in contact with the bottom oscillate back and forward in straight lines. The length and the velocity of advance of a wave of a given period are less in shallow than in deep water; and in order that a wave may advance with a given speed in shallow water, it must be of greater length and longer period than a wave which advances with the same speed in deep water.

When water is *very* shallow compared with the length of the wave, the velocity of advance becomes sensibly independent of the length and period of the wave, and is nearly equal to the velocity acquired by a heavy body in falling through one-half of the depth from the surface to the bottom; viz., in feet per second, $\sqrt{}$ (32·2 depth in feet): also, the extent of horizontal displacement is

nearly the same from the surface to the bottom; and the extent of the vertical displacement of any particle is nearly proportional to its mean height above the bottom.

In cases in which the depth of the water is such that both it and the length of the wave have a material influence on the velocity of advance (that is to say, speaking roughly, when the depth of the water is between one thirty-sixth and five-twelfths of the length of a wave), that velocity follows a law which cannot be clearly expressed except by a complex algebraical formula.

The following table (extracted from Rankine on 'Shipbuilding') shows a few examples of its results:—

Depth from centres of orbits of surface particles to the bottom, in fractions of a wave-length.	Ratios of Quantities for Shallow Water to the corresponding quantities for Deep Water.		
	Velocity for a given Length.	Length and Velocity for a given Period.	Length for a given Velocity.
$\frac{1}{36}$.....	·417	·174	5·76
$\frac{2}{36} = \frac{1}{18}$	·579	·336	2·98
$\frac{3}{36} = \frac{1}{12}$	·693	·481	2·08
$\frac{4}{36} = \frac{1}{9}$	·776	·603	1·66
$\frac{5}{36}$.....	·838	·703	1·42
$\frac{6}{36} = \frac{1}{6}$	·884	·781	1·28
$\frac{8}{36} = \frac{2}{9}$	·940	·884	1·13
$\frac{10}{36} = \frac{5}{18}$	·969	·939	1·06
$\frac{12}{36} = \frac{1}{3}$	·985	·970	1·03
$\frac{18}{36} = \frac{1}{2}$	·995	·989	1·01

Surf-waves and Breakers.—When waves travel from deep into shallow water, their periodic time continues unaltered; and therefore they become gradually shorter. The energy of each wave is thus gradually communicated to a smaller and smaller mass of water, and the extent of motion of the particles consequently increases. Thus it is that waves are produced, on some rocky coasts, of 150 feet high. But to that increase a limit is put by the breaking of the wave crests. Thus the waves traveling over long shallows are gradually broken down, and their energy expended in producing foam and eddies.

Waves of Translation are produced by the transmission of a motion of such a kind, that each particle, instead of returning periodically to the point from which it set out, is brought, at the end of the wave-period, to a point in advance of or behind its original position, as the case may be. The existence and phenomena of waves of this class were discovered by Mr. Scott Russell.* A wave of translation is said to be positive or negative, according as it shifts the particles of water forwards or backwards.

A positive wave of translation is *solitary;* that is, it travels alone, and is not necessarily preceded or followed by a series of other waves. Its surface presents a swell rising above the level of still water throughout its whole length; and each particle at which it arrives is lifted up from a state of rest, carried forward in an arched curve, and set down at rest in a position at a certain distance in advance of its original position, which distance is sensibly the same throughout the whole depth of the water. The length of a positive solitary wave of translation is shorter, by the distance through which a particle is transferred, than the circumference of a circle whose radius is the undisturbed depth of the water. The velocity with which the wave travels is sensibly equal to that acquired by a heavy body in falling through half the depth from the *crest* of the wave to the bottom of the water.

If a wave of translation is a *negative* wave, or wave of backward translation, it presents a hollow, sinking below the level of still water throughout its whole length; and each particle at which it arrives is depressed from a state of rest, and carried backward in an inverted arched curve. A negative solitary wave is longer, by the distance through which a particle is transferred, than the circumference of a circle whose radius is the undisturbed depth of the water; and it travels with a velocity equal to that acquired by a heavy body in falling through half the depth from the *trough* of the wave to the bottom of the water.

The height of the *equivalent pendulum* of a wave of translation, is equal to the depth from the crest or trough of the wave, as the case may be, to the bottom of the water.

In all Mr. Scott Russell's experiments on negative waves of translation, each such wave was followed by a series of rolling waves; but it is not unlikely that a solitary negative wave of translation might be produced by some special mode of experimenting.

From what has been stated respecting the velocity and length of a wave of translation, it appears that such a wave, if positive, is shorter, and if negative, longer, by the extent of the translation, than the rolling wave which travels in *deep water* with the same speed; and when the height of the wave, and consequently the extent of translation, are small compared with its length, the relations between the velocity, length, and period of the wave of translation are approximately the same with those given for rolling waves in deep water.

A wave of translation in deep water may be conceived to be formed *approximately* as follows:—With the revolving motion of the particles in a rolling wave, let there be combined, if the wave is positive, a forward current in each layer of water, and if the wave is negative, a backward current in each layer of water, having a velocity equal to the velocity of the revolving motion. The wave thus produced will have the same relations between its velocity, length, and period, with the wave of translation in shallow water already described, and the form of its surface will be nearly the same; but the extent of translation will diminish, in going downwards, in geometrical progression.

The motion of the tides is analogous to that of a series of very long waves, in which the extent of the horizontal motion of the water is very much greater than that of the vertical motion. [TIDES.]

Action of Waves on the Coast.—The height of the waves which beat on a given coast during a storm depends on what is called the 'fetch;' that is, the distance from the weather shore where their formation commences. According to Mr. Thomas Stevenson ('On the Design and Construction of Harbours'), the following formula is nearly correct during heavy gales, when the fetch is not less than 6 nautical miles: height in feet $= 1{\cdot}5 \times \sqrt{}$ (fetch in nautical miles). The following are some examples of the pressures of waves against a vertical surface, as observed by Mr. Thomas Stevenson, at Skerryvore.

	Summer average.	Winter average.	Storms.
In lbs. per square foot,	611 ...	2086 ...	6083
In feet of water, . .	9·8 ...	33 ...	97

Greatest height of breakers on the south-west coast of Ireland, as observed by the earl of Dunraven, 150 feet.

Recent investigations tend towards the conclusion,

* Reports of the British Association, 1844. An investigation of the theory of those waves by Mr. Earnshaw appeared in the Cambridge Transactions for the same year.

which is in accordance with observation, that every wave is more or less a 'wave of translation,' setting down each particle of water, or of matter suspended in water, a little in advance of where it picked that particle up, and thus by degrees producing that heaping up of water which gathers on a lee shore during a storm. This property of waves accounts for the facts, that although they tend to undermine and demolish steep cliffs, they heap up sand, gravel, shingle, or such materials as they are able to sweep along, upon every flat or sloping beach against which they directly roll; that they carry such materials into bays and estuaries; and that when they advance obliquely along the coast they make the materials of the beach travel along the coast in the same direction. The flowing tide augments, and the ebbing tide diminishes, the speed and force of storm waves; and hence the observed fact, that the most powerful action of such waves on the coast occurs after half-flood, when the shoreward current is strong. (Rankine *On Civil Engineering.*)

WAVRE. [Brabant, South.]

WAX (Ang-Sax. *wax;* German, *wachs*). There are several varieties of this substance. *Bees'-wax*, with which the honeycomb is constructed, is a secretion from the ventral scales of the bee. From the comb the wax is extracted chiefly by pressure and by melting it in hot water, and the impurities having subsided, it is poured into moulds. It has a yellowish or orange colour and peculiar odour. Even in winter it is soft enough to be indented by the nail, and in summer it is much softer. It melts at about 143° to 150° Fahr., and is a non-conductor of electricity.

White Wax is obtained by melting yellow wax by means of steam, and running it off into a perforated trough called a Cradle, from which it falls into water. By this means it is solidified and converted into a kind of ribbon; it is afterwards bleached, re-melted, re-bleached, and refined. Pure wax thus obtained is nearly devoid of smell, and white with a yellowish tint; it is brittle and insipid; its melting point is 158° Fahr., and it solidifies at 149°. Its specific gravity is ·96.

Chemists differ considerably in opinion as to the nature of wax; some supposing it to be a homogeneous body, while others are of opinion that it consists of two different substances, *Cerin* and *Myricin*; to which some writers add a third, called *Cerolein*. Their relative proportions vary, but in ordinary bees'-wax appear to be about 73 per cent. of *myricin*, 22 of *cerin*, and 5 of *cerolein*. When wax is strongly heated it is decomposed into carbon, hydrogen, and oxygen.

Several plants yield waxy products, as the *Myrica cerifera*, the *Ceroxylon andicola*, and others.

Sealing-wax is composed of shell-lac (4 parts), Venice turpentine (1 part), and cinnabar (3 parts). The round sticks are made by hand on a smooth slab of marble, which is kept at a moderate temperature by a brazier or chafing-dish placed beneath it. A quantity sufficient to make about six sticks is rolled out on the slab into one long stick, which, when of proper diameter, is cut into lengths. These are rolled on a cold stone beneath a smooth piece of wood or metal, and afterwards polished by gently fusing the surface, when devices are stamped upon them. Sticks of a more complicated shape are cast in moulds. For the best black sealing-wax, the finest ivory-black is substituted for the cinnabar. Inferior materials are used for cheap wax. Soft sealing-wax contains bees'-wax in the place of the shell-lac.

WAX-PALM. [Ceroxylon.]

WAX-WING. [Bombycilla.]

WAY, *Chimin* (from the French *Chemin*), is a legal term used to denote either a right, in one person or more, of passing over the land of another, or the space over which such right is exercisable. In the former sense a way is an incorporeal right of the class called Easements.

There are five kinds of way: 1, a foot-way, for persons passing on foot only; 2, a horse-way, for persons passing on horseback, but including a foot-way; 3, a drift-way, for driving cattle; 4, a carriage-way, for leading or driving carts and other carriages, always including a foot and horse way, and usually, but not necessarily, including a drift-way; 5, a water-way, for ships and boats. [River.]

All these may be either private or public ways. Private ways are enjoyed by particular persons or classes; public ways are open to all persons; hence such a way is said to be, in the language of pleading, a common and public queen's highway.

I. The proper origin of a private right of way is a grant from the owner of the soil.

Such a grant may be made to a party, or to him and his heirs *in gross*, that is, without respect to any land or house of which he may be the owner or occupier: or to the grantee, his heirs, and assigns, being owners of such a house or close; in which case the right granted will be appurtenant to the house or close to which the grant is annexed, and the right will pass with the house or close.

The grant of a way may be either express or implied. If a man at the time when he conveys part of his land to another has no access to the land conveyed, except over the land which he reserves, the grant of a right of way over the land reserved is implied. If a man conveys part of his land, and has no access to the part reserved, except over the land conveyed, a right of way over the land conveyed is impliedly reserved. The way so impliedly granted or reserved is called a 'way of necessity.'

The rule of law as to prescription for ways is settled by 2 & 3 Will. IV. c. 71, s. 2.

The party to whom a private road is allotted under the general Inclosure Act has a *statutory* right of way.

A private right of way may be extinguished by a deed of release executed by the party who is entitled to such way; and such a release may be presumed from a non-user for twenty years, or from a declaration made by the party that he has no such right.

By the general Inclosure Act (41 Geo. III. c. 109) all roads, private as well as public, within the district, not set out by the commissioners, are declared to be extinguished.

The grantee cannot throw the burden of repairing the way upon the grantor, unless by the terms of the grant, evidenced by the deed or by user, the grantor has engaged to enable the grantee to use the way.

II. Between private ways and public ways stand what may be called *quasi public ways*, which partake of the qualities of both, but differ in some respects from each. Such are ways which the inhabitants of a town, &c., have immemorially used from their town, &c., to a church or market. A right of this description cannot now be created.

III. A highway is created where the owner of the soil has, by express words or by some act done or forborne, declared his intention that the public shall have the use of a way over such soil.

A highway is frequently created by statute, principally under Inclosure Acts.

Whatever may have been the origin of a highway, it cannot, at common law, be destroyed or altered, except after an inquisition taken upon a writ of 'ad quod damnum.'

By the common law the burden of maintaining highways is thrown upon the occupiers of lands and tenements within the parish, or rather within the township in which the way is situated. But particular persons may be bound to repair a highway.

Any obstruction or other nuisance in a highway may be abated or removed by any person. The wrong-doer may also be proceeded against by indictment as for a misdemeanor.

The regulation of highways has frequently been made the subject of legislative interference. The statutes now in force are the 5 & 6 Will. IV. c. 50, 2 & 3 Vict. c. 45, 4 & 5 Vict. c. 51, 8 & 9 Vict. c. 71, 25 & 26 Vict. c. 6, and 27 & 28 Vict. c. 101.

In Scotland highways are regulated by 1 & 2 Will. IV. c. 43 (1831) and 8 & 9 Vict. c. 41 (1845). (Sheriff Barclay *On Highways*, 4th Edition.)

WAY, MILKY. [MILKY WAY.]

WAYS, ROMAN. Our old chroniclers give this name to four principal roads which they suppose to have been either originally formed by the Romans in Britain during their occupation of the country, or at least to have been completed by them upon lines already traced and used by the former inhabitants. The names, however, appear to be Saxon in form, though they may be Roman or British in etymology:—Watling Street, Ikenield or Icknield Street, Ermyn Street, and the Fosse. Watling Street is generally held to have extended from Dover through Canterbury to London, where it passed along the line of the present Watling Street in London, meeting the other three great roads at the central millarium in Cannon Street, pointed out by the site of London Stone. Thence it ran through Verulam (or St. Albans), Hertfordshire, and Dunstable in Bedfordshire, to Stony Stratford in Buckinghamshire, whence it skirted Leicestershire on the west to Bosworth. From this point its course is disputed, some making it proceed in a N.W. direction to Chester, others carrying it due N. to York, and thence to Chester-le-Street, in Durham. Ikenield Street is said to have commenced on the eastern side of the island in the country of the Iceni, and to have passed through London. The course westward is extremely obscure: nearly all that has been even conjectured on the subject is, that it crossed the Watling Street at Dunstable, and thence extended in the direction of Staffordshire to the western coast. Ermyn Street is conjectured by some to have run from St. David's, at the S.W. extremity of Wales, to Southampton; by others, to have stretched more directly across the country to London. The Fosse is supposed to have taken its course from S.W. to N.E., beginning near Totness in Devonshire, and passing through Bristol, Cirencester, Chipping Norton, Coventry, Leicester, and Newark, to Lincoln, and thence to London. The whole subject of these Roman highways is rather obscure and undetermined. It is, however, certain that the entire face of the country, during the Roman occupation, was covered with a net-work of roads, and these four would seem to have been the main lines, while others branched from them at various points, so as to connect every important military station with London and other principal towns, and with each other. Generally the main or military roads were marked by directness of course; in many cases they are almost coincident with, or parallel to, the present roads.

WEALDEN STRATA. The term *Weald*, or Wold, is given to a low-lying district of country situated between the North and South Downs of Kent and Sussex. The rocks of this district consist of a great series, about 1400 feet deep, of sandstones, shales, and, in some parts, beds of limestone and ironstone. The group thus generally characterized has been minutely described by Dr. Mantell as consisting of 'clays and sands, with subordinate beds of limestone and shale, containing fresh-water shells, terrestrial plants, and the teeth and bones of reptiles and fishes; univalve shells prevailing in the upper, bivalves in the lower, and saurian remains in the intermediate beds.' Some difference of opinion exists among geologists as to the true stratigraphical position of the Wealden group. Several observers hold that it should be classed with the Chalk, and be regarded as the bottom group of that formation. Others believe that its true place is at the top of the Oolite formation, and that it should be regarded as a part of that great system. The presence of fossils in the Wealden, which are met with in both of these great series, has led to this difference of opinion. For purposes of study, however, it is not of much importance to determine the true place which the Wealden group should hold in the classification of rocks, as all agree that it is intermediate between the Oolite and the Chalk, and may be scientifically examined in connection with either group. The Wealden beds are usually divided into two sub-groups, namely, the *Weald Clay*, and the *Hastings Sand*. Local names are given to different beds of the series, as Petworth marble, Ashburnham beds, Worth sands, Tilgate beds, Horsham beds, &c. The following species may be looked on as characteristic fossils:—Plants: *Abietites Dunkeri*, *Alethopteris elegans*, *Clathraria Lyelli*, *Sphenopteris gracilis*, &c. Mollusca: *Actæon Popii*, *Bulla Mantelliana*, *Corbula alata*, *Cerithium carbonarium*, &c. Crustacea: *Cypridea Fittoni*, *Estheria elliptica*, &c. Pisces: *Acrodus hirudo*, *Asterocanthus granulosus*, *Pycnodus Mantelli*, &c. Reptilia: *Chelone Mantelli*, *Hylæosaurus Owenii*, *Iguanodon Mantelli*, &c. The Wealden area is frequently referred to as illustrating on a great scale the influence of denudation. It is bounded on the north and south by chalk hills, which stand out in the form of bold escarpments—the faces of the Downs of Kent and Sussex. Chalk, it is held, corresponding in depth to that of the Downs, once covered the whole Wealden area, but this has been swept away by the influence of denuding forces, and the Weald rocks now lie on the surface.

WEANING, the art of separating a child from its mother's milk as food. The time for weaning must depend in some measure, both on the development and health of the child, and the state and health of the mother. With regard to the former, one of the first indications that the process may be commenced is the appearance of teeth. This is indicative of preparation for other kind of food, and generally occurs in healthy children about the sixth or seventh month; and it is at this period that a gradual abstraction from the breast may commence. If this be done, it is seldom that a child will require suckling beyond the first year. Where children are backward in the development of their teeth, and present other signs of want of strength and delicacy of constitution, it is frequently advisable that they should remain for a lengthened period at the breast. It is always necessary to take into consideration the health of the mother during suckling, as children may suffer much more severely from an imperfectly secreted or diseased state of the milk, than they would from immediate weaning.

WEAR. [Weir.]

WEARMOUTH. [Sunderland.]

WEASELS (*Mustelidæ*), a family of the *Carnivora*, remarkable for ferocity and predatory habits.

Under this family the following genera may be arranged:—*Gulo*, *Galictis*, *Mustela*, *Martes*, *Mephitis*, *Mydaus*, *Zorilla*, and *Lutra*, including *Enhydra*, or the Sea Otter. To these we may add *Meles*, *Taxidea*, *Ursitaxus*, *Mellivora*, &c. [Badger; *Mellivora* under Ursidæ; Otter.]

To the genus Gulo attention has already been paid. Mr. Bell has separated from it the genus *Galictis*, including the Grisons, *Galictis vittata*, Bell, a native of Guiana, Paraguay, and Brazil; and *Galictis Allemandi*, also from South America. In these animals, as in the *Mustelidæ* in general, there are anal follicles which secrete a fetid unctuous matter. The feet are subplantigrade. The Grison is the *Fouine de la Guyane* of Buffon. Allamand's Grison appears to be the *Taira* or *Galera* of Brown. Habits, those of the Polecat.

The genus *Mustela* (*Putorius*, Cuvier) includes the Polecat, the Ferret, Weasel, &c. Animal of slender form, of small size, but excessively sanguinary. The feet digitigrade. Muzzle shorter and stouter than in *Martes*. The genus is widely distributed. Three species inhabit the British Islands and also the Continent of Europe, viz., the Polecat (*Mustela putorius*), the Weasel (*M. vulgaris*), and the Stoat or Ermine (*M. erminea*). The Ferret (*M. furo*), kept in a half-reclaimed state, for the extirpation of rats and the catching of rabbits, is originally from northern Africa.

The daring, obstinacy, and bloodthirstiness of our British *Mustelidæ* are well known. They are very destructive in preserves of game, attacking eggs and young birds, together with leverets and hares; nor are they less mischievous in the poultry yard. The Weasel and Stoat, however, do great service in clearing barns and stables of rats and mice. The skins of the Polecat and of the Ermine in its winter dress are in request—that of the latter is very valuable.

The *Weasel* is *La Bellette* of the French; *Donnola* and *Benula* of the Italians; *Comadreia* of the Spanish; *Wisel* of the Germans; *Weezel* of the Dutch.

The Weasel, small as it is, will attack dogs and even men when its nest is invaded. This is framed of dry leaves and herbage, and is generally lodged in some snug locality, such as a crevice in a bank or old wall, the hollow of a tree, &c. The young are four or five in number, and there are two or even three litters in the course of the spring and summer. The Weasel swims well, climbs trees and walls, and pursues its prey both by the scent and sight with great perseverance.

The *Stoat*, or *Ermine*, is larger than the common weasel, exceeding 9 inches in the length of the head and body, the tail being rather more than 4 inches. The Stoat is *L'Hermine* and *Le Roselet* of the French; *Armellino* of the Italians; *Armino* and *Armelina* of the Spanish, and *Hermelin* of the Germans.

This species is of a reddish brown above; white beneath, with the tip of the tail black. In winter the fur becomes white, with a tinge of pale yellow, the black tip of the tail remaining unchanged. In high northern regions the fur becomes of a pure white.

The Ermine is spread over Europe generally, but is common only in the north. The finest ermine skins, that is, those with the longest and thickest fur, and of the purest and brightest colour, are imported from the high latitudes. Russia, Norway, Siberia, Lapland, furnish them abundantly. In America an allied species, *M. Richardsonii*, Bonap., is found from the most northern limits to the middle districts of the United States.

The *Polecat*, *Fitch*, or *Fitchet*, is also the *Foumart* of the British. It is the *Putois* of the French; *Foetta* and *Puzolo* of the Italians; *Putoro* of the Spanish; *Ulk* and *Buntsing* of the Germans.

This species is larger than the Stoat, the length of the head and body exceeding 1 foot 5 inches, that of the tail being about 6 inches. The fur is of two kinds, a short woolly fulvous yellow under fur, and an outer dress of long brownish black and glossy hairs; the mixture of these two produces a very agreeable effect, varied according to the proportions of the two sorts. The Polecat is generally distributed through Europe. It is common in the temperate parts, but grows scarcer in Siberia. Its fur, though inferior to that of the Sable or Marten, is nevertheless esteemed, and there is a considerable importation of the skins annually to this country from the north of Europe under the name of *Fitch*. The Polecat will breed with the female Ferret, and the mixed progeny is superior to the pure Ferret in hardiness, size, and determination.

Of foreign *Mustelidæ*, we may mention the Chorok from Siberia (*M. Sibirica*), the Polish Weasel (*M. Sarmatica*), a native of southern Russia, and the Mink (*M. lutreola*). The latter is amphibious in its habits, frequenting the rivers of the north and east of Europe, from the Arctic Sea to the Black Sea. Its odour is musky, and its fur very beautiful.

North America presents us with an Ermine (*M. Richardsonii*, Bonap.), with the Mink or Vison (*M. Vison*), resembling the European Mink in habits, and Cicognani's Weasel (*M. Cicognanii*, Bonap.), regarded by Sir J. Richardson as identical with our common Weasel.

Several striated species are peculiar to Africa. They constitute the sub-genus *Zorilla*. Example, *Zorilla Capensis*, striated with black upon a white ground.

The genus *Martes*, the *Marten*, in our island and on the adjacent Continent, presents two varieties, by many naturalists regarded as distinct species, but as we think upon very unsatisfactory grounds. These are—the Beech or Stone Marten (*Martes Fagorum*, Ray), distinguished by a white throat; and the Pine Marten (*Martes abietum*, Ray; *Mustela martes*, Linn.), distinguished by a yellow throat.

Regarding the *Beech Marten* and *Pine Marten* as varieties of one species, the same details, the colouring of the throat excepted, apply to both. The length of the head and body is about 18 inches, that of the tail about 9 inches or rather more. The fur is deep and full, especially during the winter, and is very beautiful.

It is said that the Beech Marten, though often found in woods, prefers stony and rocky localities, and affects the vicinity of farm-yards and homesteads; while the Pine Marten is more recluse, and frequents the deep forests.

These active and graceful animals swim well, and climb trees with the address of a squirrel; they prey upon birds and small quadrupeds, and are very destructive in preserves of game. They breed in the hollows of trees and the crevices of rocks. The nest is constructed of leaves and dried herbage, and the young are generally about three in number.

With respect to the Pine Marten of America, of which thousands of skins are annually imported into England, we may state that it inhabits the northern regions from the Atlantic to the Pacific in great numbers, and is observed to be particularly abundant where the trees

bottom of which is the aperture, almost touches the water. It is made of green grass, curiously interwoven,

Another species, *Philetærus*, Smith (*Loxia socia*, Latham), fabricates a republic of nests in one clump, and under one roof or cover, the entrance to the separate nests being on the under side of what is not unlike a dense piece of thatch.

An accurate writer thus describes the operations of these social winged citizens:—'The industry of these birds seems almost equal to that of the bee. Throughout

Nests of Weaver-birds.

the day they appear busily employed in carrying a fine species of grass, which is the principal material they employ for the purpose of erecting this extraordinary work, as well as for additions and repairs. Though my short stay in the country was not sufficient to satisfy me by ocular proof that they added to their nests as they annually increased in their numbers, still, from the many trees which I have seen borne down by the weight, and others that I have seen with their boughs completely covered over, it would appear that this is really the case. When the tree that is the support of this aerial city is obliged to give way to the increase of weight, it is obvious that they are no longer protected, and are under the necessity of building in other trees. One of these deserted nests I had the curiosity to break down, to inform myself of the internal structure of it, and found it equally ingenious with that of the external. There are many entrances, each of which forms a regular street, with nests on both sides, at about two inches' distance from each other. The grass with which they build is called the Boshman's grass, and I believe the seed of it to be their principal food, though, on examining their nests, I found the legs and wings of different insects.'

Another weaver bird's nest, that of *Ploceus icterocephalus*, Sw., brought, together with the male, female, and eggs, from South Africa to Mr. Swainson, is thus described by him:—'The nest is somewhat kidney-shaped, seven inches long, and four and a half broad: it is attached to a very slender branch, from which there are four other young shoots, which serve as so many holds for its support, and to which it is firmly fixed by bendings of strong grass leaves. The whole is very compactly made of the same materials, interlaced most ingeniously, and far more firmly than what is seen in the chaffinch or other of our most skilful builders; the lining is the heads or panicles of the grasses, thus uniting softness and coolness, the latter being an obvious advantage in so sultry a climate. The aperture is lateral, near but not upon the top, so that it serves the purpose of a window to the inmates, who are sheltered overhead by the convex top of the nest. There is something very ingenious in the construction of this opening, which is not, as at first appears, round, but semicircular; the arch being bound round with a stronger band than usual, and the plane or base much stronger, and composed of straight pieces of the stalks of grass, evidently for the purpose of giving to that part upon which the birds perched greater strength and substance.'

It would seem that the fear of injury from small quadrupeds and snakes operates upon the birds of that country in their choice of trees overhanging pools of water as the localities for their nests. There can be no doubt that parental affection dictates the choice. All the birds of South Africa are liable to have their nests robbed by small quadrupeds and snakes, and as no position is so likely to secure them against such misfortunes as those we have mentioned, they are doubtless selected under that conviction.

Another interesting species is the *Plocepasser Mahali*, whose nests in figure and texture have many of the characters of those of *Ploceus*, but are armed in a curious manner. The walls of each nest are composed of stalks of grass, whose thickest extremities are so placed as to protrude externally for several inches beyond the compact structure destined to contain the eggs. Thus each nest appears armed with numerous projecting spines, and bears considerable resemblance to the body of a porcupine with its spines partially erected. Several of the *Pyrgitæ* arm their nests after the same fashion, but they select for the purpose the delicate twigs of shrubs or brushwood, instead of stalks of grass. The object of both is, to offer an obstacle to the advance of snakes towards the eggs and young.

WEAVING, the art of interlacing threads or yarns of any substance in such wise as to produce an unbroken web, has been known from very early times. We find repeated allusions to it in the Bible. Sir J. G. Wilkinson and other authorities have shown that the ancient Egyptians were well acquainted with it; and among the Greeks and Romans it was one of the most important domestic employments of their females. The skill of the Hindus in this art is remarkable, as will be known to every reader who has seen the choice stuffs displayed at the London Exhibition of 1862, or that of Paris in 1867.

In the present article we shall glance rapidly over our subject in the following order:—*Plain Weaving; Pattern Weaving; Double Weaving; Cross Weaving; Chain Weaving; Pile Weaving; Power Weaving.*

Plain Weaving.—Calico, Irish linen, and plain silk, are good representatives of this kind of weaving. In the language of weavers, the long threads are called, according to circumstances, *warp*, *twist*, *caine*, or *organsine*; while the cross threads are called *weft*, *woof*, *shoot*, or *tram*. We shall here use the simple terms *warp* and *weft*. The warp is always affixed to the loom or weaving machine; while the weft is contained in the shuttle, a small boat-like instrument.

The first operation consists in laying the requisite number of threads together to form the width of the cloth: this is called *warping*. Supposing there to be 1000 threads in the width of a piece of cloth: then the yarn, wound on the bobbins as it leaves the hand of the spinner, must be so unwound and laid out as to form 1000 lengths, constituting when laid parallel the warp of the intended stuff. The ancient method was to draw out the warp from the bobbins at full length in an open

should be at once notified by telegraph of its approach. If, however, the winds do not increase in force, and the barometer fall but slightly, or cease to fall, we may conclude that the storm has either passed very much to the north of Britain, or that no immediate danger need be apprehended. The immense cost attending such a system of telegraphing, however, would deter any individual or company from undertaking its responsibility; but as the information is of national importance to these islands, considering the tremendous interests we have on the sea, it is natural we should look to government to provide the means of supplying the necessary intelligence. For this purpose the late Admiral Fitzroy was appointed by the Board of Trade as chief of the meteorological office. His duty was to receive every morning from the outports particulars of the weather prevailing there, and from these reports, and a study of the instruments in his own office, to make forecasts of the weather for the next two or three days. These deductions were sent every forenoon to the *Times* for publication in a second edition, and when betokening danger, were transmitted by signals to numerous stations on the coast. In this way he predicted the great storm in which the *Royal Charter* was wrecked in 1859; and the forecasts were usually acted upon with beneficial results. Out of 100 forecasts it has been ascertained that an average of about eighty-five were correct. The system was abandoned for a time after Admiral Fitzroy's death; it has since been resumed, and it has also been adopted by some European governments.

All genuine observation goes to prove that weather predictions based on solar, lunar, or other astronomical causes are without foundation, and that the only safe guides we have in this matter are of two kinds, viz.: 1, Terrestrial, whereby, on the system pursued by Admiral Fitzroy, the weather may be forecast for two or three days; and, 2, Statistical, whereby the weather of the future is inferred from the average of what has been observed in former years at corresponding seasons. Almanac makers such as Moore, Zadkiel, &c., have thus evidently thriven for many years on a widespread ignorance of the most palpable elements of physical law. In fact, the fame of all professing weather prognosticators is founded on a few happy hits, the celebrity of which will be greatly reduced on examination of the large majority of their predictions which events have never verified.

The periodical changes of the moon's phases often coinciding with changes in the phenomena of the atmosphere, it was very natural that the latter should, by many persons, be thought to have some dependence on the former; an opinion apparently strengthened by the known fact that the tides of the ocean and atmosphere are produced by the attractions which the moon and sun exercise on the particles of water and air; and there have not been wanting men who have formed tables in which the probable state of the weather is stated in connection with the hour of the day or night at which the new and full moons take place. In order to test the real value of the lunar changes on the weather, the Greenwich observations of fifty years have been carefully examined, and it is found that the number of instances in which the weather *was* in accordance with the prognostication was one less than those in which it was not. Thus, when brought to the test of accurate examination and figures, the theory of the moon's changes on the coming weather is proved to be a complete delusion. Until a more generally diffused knowledge of the laws of nature, however, it is very likely the theory will continue to be believed, prejudice going a long way towards assisting people to forget the unsuccessful prognostications in favour of those which happened to occur as predicted.

There are two or three indications of rain or fair weather upon which some reliance may be placed, which have been noticed by the late Sir Humphrey Davy in his 'Salmonia;' and as his explanations are founded on physical conditions, a brief statement of them may with propriety be introduced in this place.

One of the speakers in the dialogue inquiring why the clouds in the west being red, with a tinge of purple, should portend fair weather, is answered that the air when dry refracts more of the red and heat-making rays than when moist. It is added that a coppery or yellow sunset foretells rain; but that, as an indication of approaching wet weather, nothing is more certain than a halo round the moon, since it is produced by precipitated water: the larger the circle is, the nearer are the clouds; consequently, the more ready to descend in rain.

In explaining why a rainbow in the morning betokens rain, and one in the evening fair weather, it is stated that the bow can only be seen when the clouds depositing the rain are opposite to the sun; thus in the morning the bow is in the west, and in the evening in the east: and as the rains in this country are usually brought by westerly winds, a bow in the west indicates that the rain is coming towards the spectator; whereas a bow in the east indicates that the rain is passing away from him.

The indications of fine weather from swallows flying high, is explained by stating that the insects on which these birds feed delight to fly in a warm stratum of air; and when the warm air occupies a higher part of the atmosphere the birds find their prey in the upper regions. On the contrary, when the warm air is near the surface of the earth, the insects and birds are there also; and then, as the cold air from above descends into it, a deposition of water takes place. The reason why sea-birds come to land previously to a storm is that, as the fish upon which the birds prey go deep into the water during storms, the birds come to land merely on account of the greater certainty of finding food there than out at sea.

WEATHER GAGE, a nautical term employed to describe the passage of one ship to windward of another; in which case the former vessel is said to have the weather gage. Prior to the introduction of steam, it was the great object of naval tactic to obtain the weather gage of a hostile fleet, which gave the power of attack, and secured other important advantages.

WEATHER GLASS. [BAROMETER.]

WEAVER. [CHESHIRE.]

WEAVER BIRDS, *Ploceinæ*, a sub-family of FRINGILLIDÆ, of which the genus *Ploceus* is the type. These are the *Tisserins* (or Weavers) of the French, so called from the elaborate hanging nests which they construct, generally in company with others of the same species, thereby establishing colonies having a common interest.

To this sub-family may be referred the genera *Vidua* [VIDUA], *Euplectus*, *Ploceus*, *Amadina*, *Philetærus*, *Plocepasser*, *Textor*, &c.

Locality, the Old World only, especially Africa.

We can only notice a few species by way of illustration. Barrow describes the suspended nests of a species of *Euplectus* or *Ploceus*, as being very remarkable. These birds, uniting to form a small colony, always build on a branch stretching over a river or pool of water. The nest is shaped exactly like a chemist's retort, and is suspended from the head; the shank or tunnel, at the

threads, so were distinctive names given to the material produced; such as *whip-net*, *mail-net*, *patent-net*, *drop-net*, *spider-net*, *Paris-net*, *balloon-net*, &c. All these varieties are produced at the loom, with warp-threads stretched horizontally, and weft-threads thrown across by means of a shuttle; and the difference between them depends on the manner in which the warp threads were made to cross one another, and in which the weft-thread was thrown. In the *bobbin-net* of later times, however, the interlacing is produced by a machine very different from the common loom, and among the most remarkable which our textile manufactures afford. From 1777 to our own times repeated improvements have been made in this most ingenious invention.

The main points of difference between the bobbin-net machine and the common loom may be thus stated: in the former the warp-threads are vertical; in the latter they are horizontal. In the former the weft is wound on a brass bobbin so thin as to pass between the adjacent threads of the warp; in the latter it is contained in a shuttle an inch or more in width. In the former the transit of the weft-thread, while passing between the warp, is at right angles to the plane of the web; in the latter it is parallel with that plane. In the former the successive meshes or intersections are driven up close to those before made, by a series of pointed wires catching in the loops; in the latter they are driven up by the lay or batten. In the former there are sometimes as many as 3000 bobbins or weft-carrying implements to one machine; in the latter there are seldom more than one or two shuttles. In the former each bobbin twists its weft-thread round a warp-thread by a series of oscillatory movements like those of a pendulum; in the latter the twisting is effected rather by the movements of the warp than those of the weft.

Chain-Weaving.—We may apply this term to a mode of using threads in which a series of loops is formed by a continuous thread, each loop or link being so connected with others as to form a kind of chain; and this chain-work may either be worked upon a ground woven at the loom, or may constitute the woven material itself. *Sampler work*, *lace running*, *tambouring*, *pillow-lace*, *rug-work*, *Berlin work*, *tapestry*—all may be regarded as varieties of chain-work.

The manufacture of *stockings*, whether by the humble process of knitting or by the use of the stocking-frame, is in strictness to be called 'chain-weaving;' for the fabric itself is produced by a series of links or loops in a thread of worsted, cotton, or silk. In the process of knitting, still carried on to a small extent in secluded country districts, polished steel needles or wires are used to link threads together into a series of loops, closely resembling in their character the loops produced in tambouring. But this method has been almost entirely superseded by the ingenious *stocking-frame*, for an account of which see HOSIERY.

The common stocking-frame exhibits a quadrangular arrangement of upright posts, connected by cross-pieces at the top, and having on one side an additional piece of framing to support the weaver's seat. Near where the weaver sits is placed a series of needles, which serve the place of knitting needles in forming the loops; they are not straight needles, nor yet what would be termed hooks, but something midway between the two; and the number depends on the coarseness or fineness of the stocking. The frame is provided with a series of vibrating levers, called *jacks*, and these, aided by other intricate apparatus, throw the stocking-yarn into such curvatures as to enable the needles to form the loops. The weaver has a bobbin of yarn at one side of his frame, fr... which he unwinds enough to lay across all the wire... he then, by moving certain treadles with his feet a... levers with his hands, forms this length of yarn into... row of loops; and at the next movement, when formi... another row of bends or loops, he links the one row in... the other, so as to form a kind of chain, which ch... extending both lengthwise and across, constitutes the w... of the stocking. Machines have been invented which ... enable a workman to produce twelve stockings at on...

Pile-Weaving.—If we examine *velvet*, *fustian*, ... *veteen*, *moleskin*, *doeskin*, or a *Turkey* or *Wilton* carp... we shall find that in all of these fabrics the warp a... weft threads are almost concealed by a kind of dow... nap, or pile, which imparts a peculiarly soft and smo... texture to them. Fustians are, in fact, a kind of cot... velvet, as Turkey carpeting is a woollen velvet. A few details of this kind of weaving will be found under CARPET; FUSTIAN; VELVET.

Power-Weaving.—In 1678 M. de Gennes invented a rude kind of weaving machine, intended to increase the power of the common loom; and other looms were introduced, to be worked by a winch, by water power, or by some contrivance more expeditious than the hand; but a greater step in advance was made by the invention of Dr. Cartwright's power-loom in 1785. [CARTWRIGHT.]

One cause which delayed its general adoption was the necessity for stopping the machine frequently, in order to dress the warp with paste or size, as it unrolled from the beam; an operation requiring a man to be employed for each loom, so that there was no saving of expense. But the successive inventions of Radcliffe, Horrocks, Marsland, Roberts, and others, have since brought the dressing machine and the power-loom to a high state of efficiency.

If we take a piece of calico as the representative of plain fabrics generally, the mode of proceeding in power-loom factories may be shortly sketched as follows:—The *warping frame* is so arranged as to be worked by steam-power, and to bring the yarns into a parallel layer, which is transferred to the *dressing machine*. This latter is a large piece of mechanism, in which the threads dip into paste on their way to the warp-beam; undergoing a process of brushing after the dipping. After this dressing the *drawing* and mounting for the loom are attended to. When the warp is properly arranged in the loom, steam-power does all the rest: it forms the shed or division of the warp into two parts; it throws the shuttle; it drives up the weft with the batten; it unwinds the warp from the warp-roller; and winds the woven material on the cloth-roller.

In fig. 1 of the Plate 'Weaving,' prefixed to the volume, we show the 37-inch reed space loom of Messrs. Dickinson. This machine, extensively used in weaving fancy goods, has a three-shuttle drop-box, and is fitted with Mr. Bullough's patent 'dobby,' or newly arranged pattern action. The connection of the drop-box with the 'dobby,' as shown in fig. 1, is very simple; and as an additional advantage, a detent contrivance is also added, by which the loom is thrown out of gear whenever the shuttle chances to 'trap.' In order to prevent the shuttle from going too far through the box, and from interfering with the lowering of the box, a simple stopper is applied; and by a process through which weights may be dispensed with, the makers have avoided a very cumbrous item in the details of the ordinary loom, and have so disposed it that any strength of cloth can thus be woven with less strain upon the yarn than usual. The machine is capable of working 160 picks a minute.

Fig. 2, Plate 1, represents Mr. Platt's power-loom for plain weaving, in which the inventor has embodied several striking improvements. Thus, the picking motion is worked from the first crank shaft; and for the better ordering of the machine, the vertical picking shaft has loose tongues, which, at each alternate revolution of the crank shaft, are operated on by cams. The loom will fairly repay examination.

WEBER, CARL MARIA VON, was born 18th December, 1786, at Eutin in Holstein. His family had been ennobled in the sixteenth century; but his father, though a man of ability, was in reduced circumstances, and led a wandering life as a theatrical manager. His education was conducted with care; and as his father had acquired a reputation as a violinist, he, perhaps unconsciously, influenced his son in his choice of music as a profession, although he had shown much talent while a boy as a painter. His father about 1797 took him to Salzburg, and placed him under the tuition of Michael Haydn, brother of the illustrious composer, under whom, however, the pupil did not make much progress. At Salzburg, in 1798, was printed his first production, consisting of six fughetti, which was favourably noticed in the German *Musical Gazette*. Shortly afterwards he went to Munich, where he received lessons in singing from Valesi, and in composition from the organist of the chapel royal, M. Kalcher, to whom he says he was much indebted. Under the eye of his master he composed an opera, 'Die Macht der Liebe und des Weins' ('The Power of Love and Wine'). He also wrote a grand mass and some other works, all of which he tells us were 'wisely committed to the flames.'

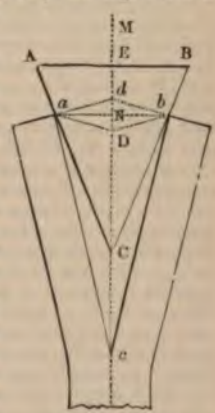
About this time his attention was diverted from music by the art of lithography, which had just been discovered, and in which he believed himself to be the author of several improvements; but this novelty soon tired him, and returning to his proper pursuits, he set to music Steinberg's opera, 'Das Waldmädchen' (the 'Wood-Maiden'), which was performed in 1800, and spread further than, at his maturer age, he thought desirable. Being called to Salzburg, he there, in 1801, composed 'Peter Schmoll.' In 1802 his father proceeded with him on a musical tour to Leipzig, Hamburg, and Holstein, and afterwards he went to Vienna, where he spent nearly two years in the study of the great masters. He next accepted the situation of music-director at Breslau, where he retouched several of his earlier works, and composed the opera of 'Rübezahl,' which afterwards appeared as the composition of Professor Rode. In 1806 Prince Eugene of Würtemberg invited Weber to Carlsruhe, where he produced two symphonies, several concertos, &c., but the war obliged him to quit this musical city. He resided for some time in the house of the Duke Louis of Würtemberg at Stuttgard, and completed his opera of 'Sylvana,' or rather remodelled it on his former work, 'Das Waldmädchen,' 1808.

In 1810 Weber set out on another professional journey in Germany. At Darmstadt, in 1810, he composed 'Abou Hassan.' From 1813 to 1816 he directed the opera at Prague, after having reorganized that establishment. Subsequently he accepted an engagement to found a German opera at Dresden, and this appointment, which he held till his decease, absorbed, during the first two years, nearly the whole of his attention. In 1822 he brought out, at Berlin, his greatest work, 'Der Freischütz.' Not only the novelty and beauty of the music, but the deep thought it evinced, excited an extraordinary sensation in the north of Germany, and subsequently in London, where it was first performed, July 23, 1824.

In November, 1823, Weber produced at Vienna his 'Euryanthe.' In 1825 he received a visit at Dresden from Charles Kemble, who offered him 500*l.* to compose an opera for the English stage, an engagement which he willingly undertook. Mr. Planché provided the drama, which was entitled 'Oberon, or the Elf-King's Oath,' and founded on Wieland's celebrated poem. It was brought out at Covent Garden, April 12, 1826, with Weber himself as conductor. He was greeted in the most cordial manner by the audience, and thoroughly satisfied with the success of his work. But his visit to London in an unfavourable season aggravated a disorder which proved to be pulmonary, and he sank rapidly. He enjoyed a benefit concert at the Argyll Rooms, but on that occasion had scarcely strength to go through his business as conductor. On June 5, 1826, he was found lifeless in his bed. He was buried in the Roman Catholic chapel, Moorfields, permission to inter him in St. Paul's Cathedral having been refused on account of his religion. His body was afterwards removed to Dresden in 1844, and a statue, by Rietschel, was erected in the open space before the Dresden theatre, 11th October, 1860. His life has been written by his son, Baron Max Maria von Weber, and translated into English by J. Palgrave Simpson (London, 1865). His 'Letters' have been published in English by Lady Wallace (1867).

WEBSTERITE, a mineral named after its discoverer, Dr. Webster. It is an earthy substance, soft to the touch, and when brought to the tongue adheres to it. It is composed of sulphuric acid, alumina, and water. It is confined to tertiary strata.

WEDGE (Ang.-Sax. *Wecg*), in Mechanics, is a prism of wood or metal whose base is a triangle: it is employed to remove two objects from one another laterally, or to rend asunder the parts of a body; an edge which is parallel to the geometrical axis of the prism being introduced between the objects, or parts of the body, and the whole wedge being then driven forward by a percussive force, as the stroke of a hammer.



Let ABC represent the section of a wedge perpendicularly to the mathematical axis; and for simplicity suppose this section to be an isosceles triangle. The plane passing through AB, perpendicular to ABC and to the paper, is called the head or back of the wedge: the planes passing through AC and BC perpendicular to the paper are called the sides; and their line of section, passing through C, is called the edge.

The motive power, supposed to be represented by some weight, is applied to the head of the wedge; and may be supposed to act in the direction MC perpendicularly to that plane, and passing through C in the edge. Let the material which is to be rent asunder be in contact with the sides of the wedge in lines passing through *a* and *b* perpendicularly to the paper; and let the two parts yield as if they were capable of turning about some point c in the direction of MC, produced if necessary: then it is evident that the effect of the wedge

will be the same as if a section of the latter, perpendicularly to the axis, were *abc*. Imagine *ad*, *bd* to be drawn perpendicularly to *ac* and *bc*; then those lines will meet at a certain point, as *d*, in the line MC: imagine also the parallelogram *adb*D of forces to be constructed; then *d*D or 2*d*N will represent the motive force, and *da* or *db* the pressure which that force exerts at *a* or *b* perpendicularly to *ac* and *bc*. Let P represent the motive force, and R the pressure at *a* or *b*; then, in a state of equilibrium, the latter will represent the reaction of the material in the direction *ad* or *bd*; and we have,

$$P : R : : 2dN : da.$$

But the triangle *a*N*d* is similar to *c*N*a*; therefore

$$dN : da : : aN : ac,$$

and consequently P : R : : 2*a*N (= *ab*) : *ac*.

If *c* were supposed to coincide with C, we should have

$$P : R : : 2aN : aC;$$

or by similar triangles *ab*C, ABC,

$$P : R : : AB : AC.$$

If the force of the wedge at the points *a* or *b* were to be estimated in the direction N*a* or N*b*; as when it is required, neglecting friction, to find the force with which a given pressure, P, in the direction MC, on the head of the wedge, would make a body at *a* or *b* slide in a direction perpendicular to MC: then, R′ representing that force, and *c* coinciding with C, or *ad* being now perpendicular to AC, we should have

$$P : R' : : 2dN : Na, \text{ or as } 2aN \text{ to NC, or as AB to EC.}$$

The best and simplest illustrations of the single wedge are axes, nails, plugs, planes, chisels, needles, and all sharp-pointed instruments.

WEDGWOOD, JOSIAH, the first improver of English pottery, and the creator of a new and important branch of English commerce, was born on the 12th of July, 1730, at Burslem, where his father earned a scanty living by working at the potter's wheel. The latter died when Josiah was eleven years old, and the boy at that early age was compelled to gain his bread by working as a thrower to his elder brother. At that time the manufacture of earthenware in England was in a very rudimentary condition, and British households were supplied with the commoner sort of ware from Delft in Holland, while China furnished the costly porcelain. Staffordshire produced earthenware only of the coarsest quality, which was hawked about the country by the workmen themselves, or by the common pedlars. A malignant attack of small-pox, which finally settled in his left leg and necessitated its amputation, compelled young Wedgwood to relinquish the potter's wheel. He formed a partnership with a workman as poor as himself, named Harrison, and began business at Stoke. His taste for decoration and a higher style of manufacture appears not to have suited the commercial notions of this partner nor of a succeeding one, named Whieldon, in conjunction with whom he had made and dealt in earthenware knife-handles, green pickle leaves, and fanciful articles of that kind. At length he returned to Burslem, and setting up on his own account in a small thatched house, by assiduous labour and close observation, animated by an ardent desire for improvement, he gradually made his way to prosperity. Among other facts, he observed that an earth containing silica which was black became white when calcined. Thereupon, mixing silica with the red powder of the potteries, he obtained a white material which, being covered with a transparent glaze, formed a beautiful earthenware that not only drove Delft ware out of the market, but soon acquired a high reputation in various parts of the world, and constituted an important item in the annual exports of this country. A new branch of industry was planted in his native county. Thousands of hands were employed and well paid where a few years previously a comparatively small number made only a poor livelihood as potters. Increasing in business, Wedgwood established a house in London, where Mr. Bentley became his partner. Every effort was made to add elegance of design to the other merits of his ware. He found out the boy, John Flaxman, then helping his father to make plaster casts, in their shop in New Street, Covent Garden. 'Well, my lad,' said Wedgwood, 'I have heard that you are a good draughtsman and clever designer. I'm a manufacturer of pots. I want you to design some models for me—nothing fantastic, but simple, tasteful, and correct in drawing. I'll pay you well. They are for pots of all kinds—tea-pots, jugs, tea-cups, and saucers. Especially I want designs for a table-service. Begin with that. What you design is meant for the eyes of royalty. Think of that.' The connection thus formed between the manufacturer and the artist was profitable and honourable to both. Wedgwood's single-hearted loyalty was sufficiently rewarded by the appointment of royal potter being conferred on him by Queen Charlotte. He was extremely successful in his imitations of ancient works of art—specimens from Herculaneum, lent to him by Sir W. Hamilton; the celebrated Barberini or Portland vase, lent by the duchess of Portland; and many rare samples of porcelain. He was also a zealous improver of the county he lived in, made a turnpike-road 10 miles long through the Potteries, and vigorously seconded Brindley in the construction of the Trent and Mersey Canal. In 1771 he built a mansion and works near Newcastle-under-Lyne, round which he formed a village for his workmen, calling it Etruria. Here he died on the 3rd of January, 1795. His life has recently been written in 2 vols., by Eliza Meteyard (London, 1865), on an elaborate and comprehensive scale; and a more popular but less complete biography by Llewellyn Jewitt, 1865.

WEDGWOOD WARE, a superior kind of semi-vitrified pottery, without much glaze, but capable of receiving all kinds of ornament by means of metallic oxides and ochres. Admirable imitations of Etruscan and other vases have been executed in this material. [WEDGWOOD, JOSIAH.]

WEDNESBURY. [STAFFORDSHIRE.]

WEDNESDAY. [WEEK.]

WEEDON-BECK. [NORTHAMPTONSHIRE.]

WEEDS. Every plant which grows in a field other than that of which the seed has been sown by the husbandman is a weed, and, inasmuch as it interferes with the intended crop, should be carefully eradicated. It is a proof of good cultivation when few weeds appear amongst the growing crops; and many of the operations of tillage are intended chiefly for their destruction. One of the principal uses of summer fallows is to destroy those which come up in spring, and would shed their seeds in summer, if the plants were not destroyed before they ripen. When roots are sown in drills and carefully hoed, they produce the same cleansing effect, and supersede the fallow: but in heavy loams which have been neglected and overrun with weeds, a clean fallow is sometimes indispensable, before any improved method

can be adopted. When a farmer enters on lands which are in a foul state, it is the cheapest way in the end to sacrifice a crop, and thoroughly purge his fields from weeds, especially those which have vivacious roots, and cannot be extirpated by simple ploughing. The mode of doing this must depend on the nature and duration of the weeds, whether their roots are perennial or die off after the plant has borne seed. Annual weeds are most readily extirpated by repeated harrowings, by which the seeds are brought within the influence of the atmosphere, and when they have fairly vegetated may be buried or rooted out, and by exposing their roots to the influence of a hot sun, they are effectually destroyed. The seeds of these weeds are chiefly brought on the land in the manure which is made in the yards, where they have been swallowed by the cattle fed on hay or straw, and have passed through the animals indigested. They are also largely sown by the farmer himself, if he is not careful in the exclusion of all foul seed.

One of the greatest advantages of straw, of artificial manures, and of composts made with human excrements mixed with earths and mineral substances, is that they introduce no weeds into the soil. It is reported that in China, where the dung of cattle is little used, in comparison with human excrements, no weeds are to be found in the fields. Much expense might thus be saved, which is now unavoidably incurred in destroying them. Feeding sheep on roots and corn while they are folded on the land, is another mode of manuring a field without introducing weeds, especially if no hay is given them, except clover-hay of the second crop, which is generally most free from their seeds.

Perennial weeds, such as various thistles, docks, &c., are very difficult to eradicate, as the roots strike deep in the ground, and throw up fresh shoots every year. They are most effectually destroyed by drawing, when sufficiently grown to allow of that being done.

Besides the common couch grass, *triticum repens*, which is the pest of farmers on light soils, there are a variety of plants which spread both by the roots and by creeping along the surface. Of this kind are the different sorts of *quitches*, as they are provincially called, which grow on wet soils; and the only mode of extirpating them is draining and careful tillage. The most effectual means of destroying common couch is by the fork. After the ground has been once ploughed, if it be forked up carefully in dry weather, and the tufts of couch with their roots be exposed to the hot sun, they may be raked off and burnt.

There are many other weeds, both in arable and pasture land, that indicate slovenly culture, and which disappear on careful cultivation, such as briers, furze, broom, and rushes, the last being a well-known sign of superabundant moisture, and only to be destroyed by under-draining.

Annual and biennial weeds are easily got rid of in comparison with those that have perennial roots, and some of which increase the faster the more the latter are divided. It may be proper to observe that generally too little attention is paid to the weeds in upland meadows and pastures, many of which are detrimental when they are eaten for want of better food. Of this kind are butter-cups, which, where the cows are forced by hunger to eat them, may be very injurious to their health and to the production of good milk. As these plants have strong perennial roots, they take possession of rich moist soils to the exclusion of good grasses. When not very abundant the plants may be weeded out by means of a sharp spud or hoe, and the expense will be well repaid in the improved quality of the hay or pasture after this has been done.

WEEK (Ang.-Sax. *weoc*). This well-known period of seven days, now universally adopted over the Christian and Mohammedan world, is the most obvious and convenient division of the lunar month; and it is also, more nearly than any other short term would be, an aliquot part of the solar year of 365 days.

Dion Cassius attributes the invention of the week to the Egyptians, from whom he seems to say it was borrowed in later times by the Greeks and other nations. It was unknown to the Greeks of the classical ages, and also to the Romans, till it was gradually adopted along with Christianity after the reign of Theodosius.

The curious passage we have referred to in Dion Cassius is the source of all that is known as to the origin of the names that have been given to the seven days. The Ptolemaic arrangement of the heavenly bodies according to their distances from the earth is in this order:—Saturn, Jupiter, Mars, the Sun, Venus, Mercury, the Moon (Saturn being the most distant); and it was a principle of the ancient astrology that these planets presided in this succession over the hours of the day. Upon this notion, if the first hour be assigned to Saturn, it will be found that the 25th (or first hour of the second day) will fall to the Sun; the 49th (or first of the third day) to the Moon; the 73rd (or first of the fourth day) to Mars; the 97th (or first of the fifth day) to Mercury; the 121st (or first of the sixth day) to Jupiter; and the 145th (or first of the seventh day) to Venus. *Dies Saturni* (the day of Saturn), *Dies Solis* (the day of the Sun), &c., are accordingly the Latin designations that have been given to the days of the week; and from these have been formed the modern names used in different countries, either by literal translation (in the Italian, Spanish, French, and other languages of the Latin stock), or, in the Teutonic tongues, by the substitution, in some cases, of the corresponding deity of northern paganism for the classical god. Thus the deity of the Old Saxons most resembling Mars being held to be Tiu, the day of Mars was called by them, after their conversion to Christianity, Tiues Daeg, whence our Tuesday. For a similar reason the day of Mercury received the name of Wodnes Daeg (that is, Woden's Day), whence our Wednesday; the day of Jupiter, Thunres Daeg, or Thor's Day, whence our Thursday; and the day of Venus, Frige Daeg, or Friga's Day, whence our Friday.

It is a remarkable fact, that the week of seven days is not only a recognized space of time in the ancient Brahminical astronomy, but that the days (beginning with *Soucrararam*, 'the day of Venus,' or our Friday) are named in succession after the same planets or heavenly bodies as among the Greeks and Latins. In the earliest times, however, it seems to have been only among the Jews that a religious signification was given to the seventh or concluding day. They had also three other periods denominated weeks:—1, The week of weeks (See Deut. xvi. 9, 10). 2, The week of years; that is, seven years, during the last of which the land remained untilled, and the people enjoyed a sabbath. 3, The week of seven sabbatical, or forty-nine years, which was succeeded by the jubilee (Lev. xxv.). The *Feast of Weeks*, otherwise called the Feast of Pentecost, Feast of Harvest, &c., was celebrated seven weeks, or forty-nine days, after the Passover, in commemoration of the giving of the law on Mount Sinai, fifty days after the departure from Egypt.

WEEPING WILLOW. [SALIX.]

WEEVIL, the name popularly applied in England to

the beetles which constituted the genus *Curculio* of Linnæus, now the type of a large family of coleopterous insects, distinguished by the prolongation of the head, so as to form a sort of snout or proboscis. The weevils are favourites with the entomologist on account of the singularity and often beauty of their forms and colours. The splendid diamond beetle, the wing-cases of which furnish such gorgeous microscopic objects, is a member of the tribe. Many of them are adorned with the most vivid metallic lustre, and some in intensity and brightness of hue emulate gems. The family includes very numerous genera and species, distributed widely over the world.

The weevils are interesting in another point of view. Many of them are dangerous enemies to the agriculturist, destroying grain, fruit, flowers, leaves, and stems, and from their numbers often perpetrating serious mischief.

WEIGHING-MACHINE is any contrivance by which the weight of an object may be ascertained. Under the words BALANCE, SPRING BALANCE, and STEELYARD, the machines by which materials of comparatively small magnitude are weighed are explained. The apparatus usually employed for the purpose of determining the weights of laden carriages may be described as a platform sunk on a level with the road, and made to rest at four points on a double lever of the second kind. [LEVER.] The extremities of the arms of these two rest upon a third lever, which is of the first or second kind; and this last either serves as a steelyard, or is connected with one arm of an ordinary balance, or with the extremity of a steelyard. Various kinds of balances and steelyards are represented in the Plate prefixed to this volume. They need no special description, the principles on which they are constructed being fully explained in the articles already named.

WEIGHT. [PRESSURE.] The weight of a body, that is, of a given bulk of known substance, is referred to that of water by what is called the SPECIFIC GRAVITY of the substance. It is said, for example, that the specific gravity of ivory is 1826, when that of water is 1000. This means that any bulk of ivory is more weighty than the same bulk of water in the proportion of 1826 to 1000. When the specific gravity of water is called 1, that of ivory is 1·826. But it is to be remembered, when weight is to be very accurately taken, that every body is buoyed up to a certain extent by the air; and the weight of a body in air is less than it would be in a vacuum by the weight of its own bulk of air. Now the air varies in weight, as may be ascertained by the indications of the barometer, in a manner depending upon the superincumbent pressure, the temperature, and the quantity of moisture contained in it. A hundred cubic inches of dry air, when the barometer is at 30 inches and Fahrenheit's thermometer at 60°, weigh 31·012 grains. In measuring standards of weight, therefore, close attention must be paid to the state of the air at the time of weighing, and to the substance weighed. If an iron weight balance a wooden one in a given state of the atmosphere, for that very reason there cannot be strict equilibrium in any other state of the atmosphere. Wood being at least seven times as bulky as iron, the effect produced on the weight of the wood by the alteration of the state of the air is at least seven times as much as that produced on the iron.

WEIGHT OF THE EARTH. The quantity of matter which the earth contains must absolutely be our only guide to that of any other planet. The relative masses of two planets can be found by calculation of the effects which they produce upon any third body; but the mass of a planet with reference to any given substance, as water, cannot be directly determined in any instance except our own earth. Perhaps a problem could hardly be proposed which would seem more impracticable to the ordinary reader than that of determining the mean density of the globe. It amounts to asking this:—If it were required to substitute for the earth a solid mass of the same size, *but of uniform material*, in such a manner that the absolute weight of bodies on its surface should remain the same, and the attraction of the whole on other planets remain the same—what must the material be?

Of necessity this question was started by Newton, whose system was the first in which it became of much interest. Having no means of submitting it to experiment, he made one of those sagacious guesses, which, had they been collected and preserved, would alone have kept his memory alive. He judged the earth to be between five and six times as massive as the same bulk of water; which is the truth.

The relative masses of two planets are determined by the observation of their effects upon a third. Two preliminaries are required: first, the great assumption of the theory of gravitation, that any two particles of matter must attract one another with forces which at different distances are directly as their masses, and inversely as the squares of those distances; secondly, the mechanical consequence of this law of action, namely, that two spheres, having their centres at any given distance, attract one another in the same manner as if each were collected in its centre.

In the case before us the earth itself is made one of the planets. Some known substance, a mountain or a ball of lead, is made the other planet. The attracted body is not a planet, but a pendulum or a plumb-line, and the effect of the mountain or ball of lead upon the plumb-line is measured, that of the earth being either measured or previously known. The actual attraction of the mountain or ball of lead being thus determined, its effect as it would be if placed at the centre of the earth can be calculated; which effect is to the effect of the earth as the mass of the mountain or ball of lead to that of the whole earth.

The first practical attempt to ascertain the mean density of the globe was made in the year 1773 by Dr. Maskelyne, the astronomer royal, who, with other gentlemen, made a number of observations on the mountain of Schehallion, in Scotland. After four months spent in the necessary arrangements and observations, it was ascertained beyond dispute that this hill exerted a sensible attraction, so far as to deflect a plumb-line from the perpendicular. The observations were made on both its sides, and from these it appeared that the sum of the two contrary attractions exerted upon the plumb-line of the instruments was equal to eleven seconds and a half. It was deduced from these experiments that the specific gravity of the earth was more than five times that of water.

Leaving the subsequent experiments of Cavendish, Baily, and others, who, after an immense number of the most careful and intricate experiments, came to the conclusion that the mean density was 5·48 that of water, mention may more particularly be made of some observations carried on with the same view by Mr. Airy, the present astronomer royal. These consisted in ascertaining the amount of variation in the force of gravity at the top and bottom of a deep mine, by simultaneous observation of the oscillations of a free pendulum at each station. As early as the year 1826 Mr. Airy endeavoured, in conjunction with the late Dr. Whewell and Mr. Sheepshanks, to effect the same

object by means of pendulum experiments in the Dolcoath mine in Cornwall; but the project failed, principally from the difficulty of comparing the clocks at the top and bottom of the mine. In more recent times the application of galvanic electricity to the transmission of signals suggested to Mr. Airy an easy method of conquering this impediment. Accordingly, in the summer of 1854 he resolved to repeat the experiment, and chose for that purpose the Harton colliery, near South Shields, the bottom of which is no less than 1260 feet beneath the earth's surface. Several English observatories co-operated in the enterprise by furnishing assistant observers, and the Electric Telegraph Company supplied the means of establishing simultaneous galvanic signals between the upper and lower stations. The plan adopted consisted of 104 hours of incessant observation of one pendulum, A, above, and another pendulum, B, below; then of 104 hours with B above and A below; then of 60 hours with A above and B below; then of 60 with B above and A below.

It has been already stated that the direct object of these experiments was to ascertain the amount of the daily acceleration of a seconds pendulum at the bottom of a mine, over another placed in similar circumstances on the surface; and that the increased velocity attained at the lower station is caused by a greater force of gravity acting on the pendulum. Now, it was found from these experiments that the force of gravity was more intense at the lower station than at the upper by $\frac{1}{19100}$th part of the whole force, and that its effect on the pendulum was such as to cause that at the lower station to make two and a quarter vibrations a day more than the corresponding one at the upper station.

Several important considerations had to be taken into account before the final result could be obtained. The formation of the crust or shell between the two stations had to be completely investigated, the surface of the neighbouring country surveyed, and the thickness of every stratum of earth, rock, coal, &c., in the shaft measured. One hundred and forty-two different layers were found, the specific gravity of which was determined by Professor Miller, of Cambridge. The final conclusion which Mr. Airy deduced from these experiments was, that the mean density of the earth is 6·623, the mean density of water being represented by unity. This result, it will be seen, is considerably higher than any hitherto found.

The most recent operations for determining the mean density of the earth are due to Colonel James, superintendent of the Ordnance Survey, who, in 1855, caused a series of observations to be made to the north and south of Arthur's Seat, near Edinburgh, for the purpose of ascertaining the deflection caused by the attraction of the mountain. The result was found to be 5·316, with a probable error of 0·054.

WEIGHTS AND MEASURES. It is impossible to over-estimate the importance of having a recognized system of weights and measures, based on certain correct and readily accessible standards of magnitude, weight, and value. Without these, mercantile transactions and scientific and other statistics would get into a state of unintelligible confusion, and give rise to endless mistakes and ceaseless quarrels. The excessive inconvenience arising from the adoption of various systems in one country has been amply illustrated in Great Britain by the existence of one bushel in Winchester and another in York; one acre in England, another in Scotland, and a third in Ireland; troy weights, avoirdupois weights, and apothecaries' weights; all these making a most vexatious complication of what ought to be very easily understood.

The best method of obviating this inconvenience is the construction of standards of reference, the same to be preserved in the custody of some public authority, so as to be easy of access when questions arise. And, in case of loss or deterioration, to insure the permanence of a standard, carefully constructed copies should be made of an authorized one; if these were distributed among the larger towns of the kingdom, manufacturers of weights and measures would thereby be deprived of any excuse for errors in their workmanship.

Simple as this may appear, it is nevertheless a work requiring the exercise of the greatest skill and scientific nicety. It would not much matter if a draper's yard measure varied the 1000th of an inch from the recognized standard; but if two standard measures differed as much one from the other, it would be a source of constant trouble to those engaged in accurate mathematical work. Very minute details have to be considered in the construction of standard weights or measures. Especial regard must be had to the material used, which should be that least liable to decay; but against the most suitable in this respect, as glass or platinum, there are the decided objections of brittleness in the one case, and extreme softness in the other. The material must also be that best calculated to resist the changes of temperature, climate, &c.; for, in the case of a standard measure, any bar we could make would be longer in London than at John O'Groat's, and shorter on a winter's day than a summer's. Deal wood, which would be the material least influenced, must be rejected as not sufficiently durable.

Their preservation is also a matter of the utmost importance, and this, too, is attended with some difficulty. If a standard measure be made of the exact length, however durable the material, the ends will get worn by handling and repeated contact, and it is thereby to an appreciable extent rendered untrue. This is avoided by making the bar, instead of just the yard measure, a little longer, and marking the yard upon it. In the case of the standard of weight, accurate preservation is next to impossible. A slow, though sure waste, is caused on every occasion it is used, at each removal of dust from its surface, and by the oxidation of the metal; so that all we are able to do is to retard this deterioration as much as possible.

Since the year 1824 the subject of weights and measures has been very clearly defined by Act of Parliament, the statute 5 Geo. IV. c. 74 having been passed to enforce uniformity in those used in Great Britain and Ireland. This Act is still in force, with the exception of some alterations made in it by the 5 & 6 Will. IV. c. 63, whereby 'heaped' measures were abolished, and inspectors appointed to examine and stamp weights and measures, and to enforce penalties upon any one using other than those authorized by the Act. This inspection has been extended to persons selling in the streets and public places.

By the first Act mentioned, it was declared that the standard yard for the British empire should be a portion of the brass rod then in the custody of the clerk of the House of Commons, on which was engraved 'Standard Yard, 1760.' In this brass rod two pins of gold were inserted, dressed flat with the surface of the ball, and a small dot made in the middle of each. The distance between the centres of these two dots, taken when the temperature is at 62° by Fahrenheit's thermometer, is declared to be the 'Imperial Standard Yard.' The Act

defined the means whereby the standard should be restored if lost, defaced, or otherwise injured; which was to be done by comparing it with the pendulum vibrating seconds of mean time in the latitude of London, in a vacuum on the level of the sea, the yard being in the proportion of 36 inches to 39·1393 of the pendulum. Since 1824, however, a large number of copies of the authorized brass rod have been taken and accurately verified, so that the tedious process of restoration will perhaps never be necessary, a genuine copy being always accessible.

The standard of weight is declared to be one cubic inch of distilled water, weighed in air by brass weights when it is at the temperature of 62° Fahr., the barometer being at 30 inches. Such cubic inch of water is equal to 252·458 grains, the standard troy pound being 5760 of such grains, and the avoirdupois pound 7000.

The standard measure for capacity, as well for liquids as for certain dry goods, is declared to be the gallon, containing 10 lbs. avoirdupois weight of distilled water of the temperature of 62° Fahr., the barometer being at 30 inches. For coals, culm, lime, fish, potatoes, fruit, &c., the standard measure is the imperial bushel, containing 80 lbs. avoirdupois of water, as before; the same being made round, with a plain and even bottom, and being 19½ inches from outside to outside.

By the Act 29 & 30 Vict. c. 82, the custody of the imperial standards of weights and measures was transferred to the Board of Trade: and the same statute enacted that certain duplicate standards should be compared with the originals once every ten years.

Seeing the great advantage arising from uniformity of weights and measures in one country, the thought naturally occurs that it would be a still greater boon, especially for the purposes of trade and commerce, to have a system which as far as practicable should be universal. It is easily seen that no particularly national system can ever become of world-wide uniformity. There is no special reason why the Turkish almud or pike should give place to the English gallon or yard, any more than *vice versa*. Each standard answers the local purposes of its country very well, and either nation would have the same prejudice against yielding to the other; so that it is useless ever to hope for a cosmopolitan uniformity unless some method of weighing and measuring can be devised, which should not be the peculiar notion of any particular country, but whose adoption would require the mutual abnegation to some extent of every system peculiar to a certain locality, and which would commend itself to all by its absence of nationality. The nearest approach to such a desideratum is found in the metric system; and to lead the way for its general adoption, the French have given up most of their ancient weights and measures and made it their national standard. The question of substituting it for our present method has been several times before the House of Commons, and recommendations to that effect have frequently been made by parliamentary committees.

The word 'metric' is derived from the French *mètre*, the name of the linear measure, which is the basis of the system, including money, weights, and measures, both solid and liquid. The mètre is a ten-millionth part of a quadrant, or a quarter of a meridian of the earth, the length having been estimated from actual measurements taken between Dunkirk and Barcelona. The mètre is, by a curious coincidence, remarkably near the length of the seconds pendulum, with which our yard is connected, the length of the pendulum being about 39¼ English inches, and of the mètre about 39⅓, or 39·371 inches. The metrical system, with its equivalents in the English method, will be found more fully explained in the account of French measures below, but we may remark here that its advantages are such as to make every one wish for its adoption at no distant day. It has, indeed, been legalized so that any one may use it who chooses; but what is wanted is for government to adopt it in the levying of customs and other duties, and thus pave the way for its becoming general. To the commercial man and public companies it would prove immensely advantageous not only for its simplicity, but for the actual economy it would effect in bookkeeping. It would sweep away every form of reduction and compound arithmetic, and the use, in ordinary cases, of any fractions but decimals, which can be worked quite as readily as whole numbers; so that every mercantile transaction, from the simplest to the most important, would be conducted by the use of the common elementary rules, of which every child ten years old ought to be the master. Moreover, it would not exclude the use of the ordinary divisions of halves, quarters, eighths, and even sixteenths, which enter so much into every day use, because all these can be very readily expressed in decimals, and more easily treated in that form than as common fractions. [Decimal System.]

We now proceed to describe the English weights and measures at present used:—

Troy Weight.—[Troy Weight.] The troy pound is 5760 grains. Gold and silver are measured by this weight, as are also precious stones: but, as may be supposed, the measure of these is the grain. The diamond is valued by carats of 151½ to the ounce troy: so that the carat is very nearly 3⅘ grains. For pearls the old foil measure still exists; in which the pound is less than the troy pound by its fifth part, and the grain one-fifth less than the troy grain. In the seventeenth century the goldsmiths divided the ounce troy into 24 carats of four grains each for gold and silver: so that the pound troy contained 1152 gold-carat grains. They also divided the ounce into 150 carats of four grains each, for diamonds: so the pound troy contained 720 diamond-carat grains. But now the Carat has only the sense noted under that word, for gold and silver, and is altered as above for diamonds.

Apothecaries' Weight.—In dispensing medicines the pound troy is divided into 12 ounces, the ounce into 8 drams, the dram into 3 scruples; consequently the scruple is 20 grains. But in buying and selling medicines wholesale, avoirdupois weight is and always has been used.

Apothecaries' fluid measure.—Sixty minims make a fluid dram; 8 fluid drams a fluid ounce; 20 fluid ounces a pint. The minim of water is as nearly as possible the natural drop; but not of other substances, the drops of which vary with their several tenacities. In the imperial system a pint of pure water weighs a pound and a quarter.

Avoirdupois weight.—The pound is 16 ounces and the ounce 16 drams: the modern pound is 7000 grains (the same as the troy grains). The hundredweight is 112 pounds, and the ton 20 hundredweights. The stone is 14 pounds. The ton of shipping is not a weight but a measure—42 cubic feet, holding 24 hundredweight of sea-water.

Long Measure.—Three barleycorns make an inch, 12 inches a foot, 3 feet a yard, 5½ yards a pole or perch, 40 poles a furlong, 8 furlongs (1760 yards) a mile. 2¼ inches are a nail, 3 quarters of a yard a Flemish

5 quarters an English ell, 6 quarters a French ell. A pace is 2 steps, or 5 feet; a fathom is 6 feet. The chain is 22 yards, or 100 links; 10 chains make a furlong, and 80 chains a mile. The barleycorn is now disused, and the inch is sometimes divided into 12 lines (as in France), but oftener into tenths or eighths. On our older itinerary measures, see LEAGUE and MILE. The hand, used in measuring the height of horses, is fixed at 4 inches by 27 Henry VIII. cap. 6.

Square Measure.—A square perch is 30¼ square yards; 40 square perches are a rood; 4 roods an acre. The acre is also 10 square chains, or 4840 square yards. Rood is the same as rod.

The cubic measures, or measures of capacity, do not immediately depend upon the cubic foot, except in the case of timber. Forty cubic feet of rough timber, or fifty feet of hewn timber, make a load.

The preceding were untouched by the Act which introduced the imperial measures. The old measures of capacity, the wine, ale, and beer, and the dry measure, are now replaced by the imperial.

Imperial Measure.—This has superseded the old corn, wine, and beer measures. The gallon contains 277·274 cubic inches, and is 10 pounds avoirdupois of water Four gills are a pint, 2 pints a quart, 4 quarts a gallon, 2 gallons a peck, 4 pecks a bushel, 8 bushels a quarter, 5 quarters a load. Of these the gill and load are not named in the statute, but are derived from common usage. The Act leaves the higher measures of wine, &c., to custom, considering them apparently as merely names of casks, which in fact they are, and leaving them to be gauged in gallons.

Wool Measure.—Seven pounds make a clove, 2 cloves a stone, 2 stone a tod, 6½ tods a wey, 2 weys a sack, 12 sacks a last.

The old Scotch standard foot was 12·0194 English inches, and the mile was 1976½ yards. The Scotch liquid gallon was 833·6272 English cubic inches. Four gills made a mutchkin, 2 mutchkins a chopin, 2 chopins a pint, and 8 pints a gallon. The *Irish* malt gallon was 272¼ cubic inches, and the liquid gallon 217·6 cubic inches. The Irish pole was 7 yards, which made the mile equal to an English mile and three-elevenths, and the acre greater than the English acre in the proportion of 196 to 121.

The *French* system of measures is called *metrical*, as derived from the measurement of the earth, and is fully described in the article DECIMAL WEIGHTS AND MEASURES.

The following are the weights and measures in the countries which have the most important commercial relations with the United Kingdom:—

Austria. Gold and silver are weighed by the Vienna marc of 9 oz. troy; the centner is equal to 123 lbs. avoirdupois; the eimer, 14·94 wine gallons; the joch, 1·43 acres; the metze, 1·7 imperial bushel; the klafter, 67 cubic feet.

Belgium. The French metrical system, with a few local alterations.

Brazil. The libra is 1·012 lbs. avoirdupois; arroba, 32·38 lbs.; quintal, 129·54 lbs.; alquiere (of Rio de Janeiro), 1 imperial bushel; alquicre or cantar, in other parts, 1·82 gallons; and the oitava, 55·34 grains.

Bremen. The pfund is 1·10 lbs. avoirdupois; last of grain, 10½ imperial quarters; of coal, 2 tons; tonne of train oil, 25 imperial gallons; of linseed, 3½ bushels.

China. The tael is 1⅓ oz. avoirdupois; picul, 133 lbs.; catty, 1⅓ lb.; and the chang, 4 yards.

Denmark. The lod is equal to 227 grains troy, or about 9½ dwts. The pound is 1·101 avoirdupois, or about 100 lbs. to the cwt. The ship last is 2 tons. The taende, or barrel of grain and salt, is 3·8 imperial bushels; ditto of coal, 4·7 bushels. The foot is 1·03 English foot. The viertel is 1·7 gallons.

France. The gramme is 15·434 grains troy; the kilogramme is 2·20 lbs. avoirdupois; the quintal mètrique is 220 lbs. avoirdupois; the tonneau is 2200 lbs. avoirdupois; the litre (liquid measure) is 0·22 imperial gallon, or a very little more than a pint and three quarters English; the hectolitre (liquid measure) is 22 imperial gallons (dry measure), 2·75 imperial bushels; the mètre is 3·28 feet, or 39·37 inches; the kilomètre is 1093 yards; the mètre cube or stère is 35·31 cubic feet; the hectare is 2·47 acres; the kilomètre carré is 0·386 square mile. (2·59 kilomètres carrés is 1 square mile).

Greece. The oke is 2·80 lbs. avoirdupois; the cantar is 123·20 lbs. avoirdupois; the livre is 1·05 lbs. avoirdupois; the baril (wine) is equal to 16·33 imperial gallons; the kilo to 0·114 imperial quarter; the pike to ⅔ths of an English yard; the stremma to ⅛rd of an English acre.

Hamburg. 100 Hamburg lbs. are 106·81 lbs. English; 100 lbs. avoirdupois are 93·62 lbs. Hamburg; 112 lbs. avoirdupois are 104·86 lbs. Hamburg. The schiffspund contains 320 Hamburg lbs. = 341·79 lbs. English. The centner is 112 Hamburg lbs. = 119·62 lbs. English. The liespfund is 16 Hamburg lbs. = 17·09 lbs. English. The stein of flax is 20 Hamburg lbs; of wool, 10 Hamburg lbs. Corn is measured by the scheffel: 100 scheffels are 36¼ quarters; 100 quarters are 275¾ scheffels. The 'last' is 30 scheffels, or nearly 11 quarters. In liquid measure 100 viertels are 459·39 gallons; 100 gallons, 62¾ viertels. The Hambro elle is 22½ English inches.

Holland. The weights and measures of the kingdom of the Netherlands are similar to the French: the Netherlands 'pond' being equal to the kilogramme; the 'kan' of liquid measure, and the 'kop' of dry measure, corresponding with the litre; and the 'elle' of long measure to the French mètre. 112 lbs. English are 50·79 Netherlands ponds; 100 imperial gallons are 454·34 Netherlands kannen; 100 English yards are 91·43 Netherlands elle. A corn 'last' of 30 zakken contains 10·31 imperial quarters.

India. The maund of Bengal, of 40 seers, is 2·054 lbs. avoirdupois; of Bombay, 28 lbs.; of Madras, 25 lbs.; the candy, of 20 maunds, is 24·3 bushels; the tola is 180 grains; the guz of Bengal is 36 inches.

Italy. The kilogramme is 2·20 lbs. avoirdupois; the litre (liquid measure), 0·22 imperial gallon: the Roman libra, 0·75 lb. avoirdupois; and the Roman rubbio, 8·10 imperial bushels.

Japan. The picul is 130 lbs. avoirdupois.

Lübeck. The pfund is 1·07 avoirdupois. The tonne is 3½ bushels; and of coal, 305 lbs. avoirdupois. The viertel is 1½ gallon. The foot or half-ell is 11·346 inches.

Portugal. The French decimal metrical system of weights and measures has been legalized in Portugal; but the old Portuguese weights and measures are still largely used in commercial transactions, and are as follows:—The arratel or pound is 16 ounces; 32 arrateis make 1 arroba; 4 arrobas, 1 quintal. 1 arroba is equal to 32·38 lbs. English; 1 quintal to 129½ lbs. English; 100 arrateis to 101·18 lbs. English; 112 lbs. English to 110·69 arrateis.

Prussia. The centner is 113½ lbs. avoirdupois. The marc is 3608 grains troy, about 7½ oz. The ship last

is about 2 tons; the last of grain about 11 quarters; and of salt 3343 lbs. avoirdupois, about 1½ ton. The scheffel is 1½ imperial bushel, or 5⅛ to the quarter. The schock is 60 pieces. The tonne weight is 2270 lbs. avoirdupois; tonne, measure of coals, 6 bushels. The loth is 225 grains troy, about 9½ dwts. The eimer is 15 gallons. The morgen is 0·65 acre. The German mile is 4⅜ English miles.

Russia. The berkowitz is equal to 360 lbs. avoirdupois; and the pood, 36 lbs. The oxhuft is 58½ wine gallons; and the anker 9¾ ditto. The vedro is 2¾ imperial gallons. The inch is the English one; and the arsheen is 28 inches; the foot is 13¾ inches, but the English foot is in common use. The dessiatine is 2·702 English acres. The verst is 1166⅔ yards, or about two-thirds of an English mile. The ship last is 2 tons. The pound is $\frac{9}{10}$ of an English pound; the pood, or 40 lbs. Russian, 36 lbs. English; and 63 poods, 1 ton. The tschetvert is 5·77 imperial bushels, or $\frac{7}{10}$ of an imperial quarter; 100 tschetverts equal to 70 quarters.

Saxony. For gold and silver the Cologne marc. The commercial pound is 1·0294 lb. avoirdupois. The Dresden wispel (24 scheffels) is 69·85 bushels; the Leipzig wispel, 91.747 bushels. The Dresden eimer is 14·89 gallons; the Leipzig eimer 16·75 gallons. The Dresden foot is 11·14 inches; the Leipzig foot is 11·13 inches. The acre is 1 acre, 1 rood, 18 perches.

Spain. In the year 1849 a royal decree was issued, enacting that the French decimal metrical system of weights and measures should be employed in all government establishments and transactions; notwithstanding this, the old system is still greatly used by merchants and shopkeepers. Throughout the Spanish provinces there are various standards of weights and measures, but for the most part the 'Castilian' is that generally used for commercial purposes. Weights—25 Castilian pounds, each of 16 onzas, is 1 arroba; 4 arrobas or 100 Castilian pounds is 1 quintal; 112 lbs. English is 110·40 lbs. Castilian; 100 lbs. Castilian is 101·44 lbs. English. Corn is usually measured by the 'fanega,' 100 fanegas being equal to 19·43 imperial quarters. Liquids are measured by the 'cantara,' 100 of which are 356 imperial gallons nearly; 100 imperial gallons are 28 cantaras. It frequently happens that wine and oil are sold by weight; in this case the 'arroba' of 25 Castilian lbs. may be calculated to stand for 2¾ imperial gallons of wine, or 2·83 gallons of oil. In long measure the vara is 3 pies (feet) of 12 pulgadas (inches); 100 Spanish varas are 92¾ English yards; 100 English yards are 107·84 Spanish varas.

Sweden and Norway. The pound is 1·1 lbs. avoirdupois; the liskund 17·6 ditto; the skeppund 352·32 ditto, or 3¼ cwts. The commercial last is 2 tons. The taender of grain and salt is 3·8 imperial bushels; and of coal, 4·7 bushels. The pot is 1·7 imperial pint. The oot is 39·64 lbs. avoirdupois.

Switzerland adopted the French metrical system by a law passed in 1849.

Turkey. The oke of 400 drams is 2·8326 lbs. avoirdupois; almud, 1·151 imperial gallon; killow, 0·9130 bushel; 44 okes = 1 cantar or kintal, 125 lbs. avoirdupois; 39·44 okes, 1 cwt.; 180 okes = 1 tcheké, 511·380 lbs.; kilo = 20 okes, 0·35 imperial quarter; 316 kilos, 100 quarters; the andaze (cloth measure), 27 inches; archin (land measure), 30 inches; and the donum (land measure) 40 square paces.

United States. British weights and measures are usually employed, but the old Winchester gallon and bushel are used, instead of the new or imperial standards. They are:—wine gallon, ·83333 gallon; ale gallon, 1·01695 gallon; and bushel, ·9692 bushel. Instead of the British cwt., a quintal of 100 lbs. is used.

Ancient Weights and Measures.—The *Romans* divided the as or libra, or any other unit, into twelve unciæ, so that the uncia became little more than a name for the twelfth part. The libra of weight was thus subdivided:—3 siliquæ, 1 obolus; 2 oboli, 1 scrupulum; 4 scrupula, 1 sextula; 6 scrupula, 1 sicilicus; 8 scrupula, 1 duella; 3 duellæ, 1 uncia; 12 unciæ, 1 libra. The Roman *libra*, or poundweight, is about ·71 of the English avoirdupois pound.

In the measures of length the pes, or foot, was divided not only into 12 unciæ, but also into 16 digiti. And 4 digiti were 1 palmus; 4 palmi, 1 pes; 1½ pes, 1 cubitus; 2½ pedes, 1 gradus: 2 gradus, or 5 pedes, 1 passus; 1000 passus, 1 milliare or mile. The Roman foot was 11·62 English inches.

The *jugerum* was an area of which the scrupulum (or 288th part) was the square decempeda, or 100 square feet. The *aripennis* (whence *arpent*) was a Gallic measure; which Columella defines as semi-jugerum, but whether of Romans or Gauls is not clear.

The *amphora*, or *quadrantal*, for liquid measure, was a cubic foot, and contained about 5·6586 imperial gallons; the congius was the eighth part of the amphora.

The *modius*, or *modium*, of dry measure, was 16 sextarii, or the third part of the amphora or cubic foot.

Of the *Greek weights and measures*, which have been partly discussed in the articles TALENT and STADIUM, we can only mention that the Greek foot was longer than the Roman by the twenty-fourth part of the latter; that the parasang (originally a Persian word) was 30 stadia; that the *plethron* was 100 feet, and in square measure it was a square whose side was 100 feet in length, or 10,000 square feet; that the *metretes* in liquid measure, is said to have been an amphora and a half; and that in dry measures the *medimnus*, of which the *chanix* was the forty-eighth part, was two amphoræ.

For Hebrew weights, see SHEKEL.

WEIMAR, the capital of Saxe-Weimar-Eisenach, is situated in 51° N. lat., 11° 20′ E. long., on the left bank of the Ilm, 55 miles by railway S.W. from Leipzig, and in 1864 had 14,279 inhabitants. It stands in a pleasant valley, with a wooded mountain to the north, and low hills to the south and east. The river, over which there are two bridges, winds along the south side of the city. Weimar is an open town with irregular streets; there are, however, many agreeable houses, but its general appearance is plain and rather antique. The palace of the grand-duke is beautifully situated, and the interior is fitted up with great elegance and taste. In some of the apartments are frescoes, illustrating the works of Göethe, Schiller, Herder, and Wieland, all of whom formerly resided in Weimar. The adjoining park is the favourite promenade of the inhabitants, and would be an ornament to any great city. The court theatre was built in 1825, and was for some time under the management of Göethe and Schiller. It was then one of the most celebrated in Germany, and its opera is still very well conducted; the citizens being great lovers of music. The grand-ducal library, which is open to the public, contains above 140,000 volumes, besides manuscripts, medals, coins, copper-plates, and drawings. The principal church deserves notice, as containing the sepulchres of the reigning family, and being adorned with several fine paintings by Lucas Cranach. It also contains the

tombs of the great soldier, Bernhard of Weimar, and of Herder, the philosopher and critic. The house of Göethe in the Frauenplatz, and that of Schiller on the esplanade, are shown to the public. A monument has been erected to the memory of the latter. Weimar has a much-frequented gymnasium, a seminary for schoolmasters, an academy for drawing, painting, and sculpture, a house of correction, and an orphan asylum. Falk's establishment for destitute children was converted, in 1829, into a public school, by the name of Falk's Institution. There are some manufactures, but they are of small importance: the population deriving their chief support from the presence of the court and visitors. The principal articles of commerce are—woollen cloth, linen, leather, cards, gloves, paper, books, maps, &c. Kotzebue was born at Weimar.

WEINMA'NNIA, a genus of plants belonging to the natural order *Cunoniaceæ*. Its forty species are trees, and natives of South America and the Mauritius.

WEIR or WEAR. The constructions, whether of stonework, timber, or earth, by means of which the waters of a river are retained to a given height, or are diverted in any required direction, are known by the name of *weirs*, or *dams;* and they are principally used for the purpose of creating mill-heads, artificial navigations, or head-waters for irrigation. They are placed either across a stream, or in the line of its flow; and when in the latter direction, they may be made to regulate the height of the river by the level of their crown. They are then called *waste-weirs*, or tumbling bays, because the excess of the waters, beyond the quantity necessary to keep the surface up to the level of the crown, falls over the weir, and escapes through the bye-wash, without producing any useful effect.

Weirs across rivers are always accompanied by lock-chambers, or by flushing sluices, according to the nature of the traffic, in order to facilitate the passage from the level of the upper to the lower reach of the stream; and whenever lock-chambers are formed, it is important that their tail bays should fall again into the main stream, at a point beyond the influence of the water falling over the crown of the weir.

Very good models of weirs have been executed by Smeaton, on the river Carron; by Telford, on the Weaver; and by Stephenson on the Ribble and on the Dee. The American engineers have introduced a very economical form, consisting of what is technically called cribwork of timber filled in with loose rubble; and the Dutch execute with surprising skill massive dams of earthwork, bundles of reeds, and fascines. A very ingenious description of movable weir is used upon the Seine, in order to close the passage of subsidiary channels in the dry season. The waste and head weirs of the majority of English mill-streams, are rudely constructed earthen banks, which are too often undermined, and left in a very unsatisfactory state of repair; but the canal weirs are, as a general rule, skilfully formed. Upon the great Indian irrigation canals the most extraordinary works of this description are found.

Upon some of our rivers, structures composed of basket-work are placed for the purpose of arresting the progress of fish in their migrations up and down the stream, which are known by the name of fish-weirs. These do not interfere with the flow of rivers, and they are constructed according to the habits of the fish they are designed to catch.

It appears that no weirs can be maintained on any rivers to the prejudice of the public, or even of individuals, except such as have existed time out of mind, or such as have been erected under local acts of Parliament for the navigation of particular rivers.

The provision of the Roman law as to the maintenance of public rivers (flumina publica) against any impediment to navigation, or against any act by which the course of the water is changed, are contained in the 'Digest' (43, tit. 12, 13).

WELD, or WOOLD, also called Dyer's Rocket and Yellow Weed, a plant cultivated for the use of dyers, and known to botanists as the *Reseda luteola*. It has an upright stem, about 3 feet high, lanceolate leaves, and small yellow flowers. When the seeds are ripe, the plant is cut and dried. Its decoction is of a brownish yellow colour, which if heated with alum becomes of a fine lemon-yellow, or with diluted gin, of a pale green. By adding a mixture of whiting and alum to the hot decoction of weld, a yellow precipitate is obtained, which when washed and dried is largely used in paper-staining. Weld is the *gaude* or *vaude* of the French dyers. Its peculiar colouring principle is called *luteoline*. Large quantities of weld are imported from France.

WELLAND. [LINCOLNSHIRE.]

WELLESLEY, RICHARD COLLEY, MARQUIS WELLESLEY, the eldest child of Garrett, first earl of Mornington, was born in Grafton Street, Dublin, June 20, 1760. He was sent at an early age to Eton, where, and at the University of Oxford, he stood high for classical attainments. On the death of his father, who died in 1781, he took his seat in the Irish House of Lords, and continued a member of that body till the Union. He was then returned a member of the British House of Commons by the borough of Beeralston. At the next general election he represented Windsor, and was sworn in a member of the Irish privy council. He was soon after appointed one of the lords of the treasury, and in 1793 a member of the British privy council. He had meantime made such progress in the favour of the king and the confidence of the minister, that he was nominated to succeed Lord Cornwallis in the government of British India. He was raised at the same time to the British peerage by the title of Baron Mornington.

Lord Mornington reached the Ganges in May, 1798, and in 1799 was created Marquis Wellesley in the peerage of Ireland.

His governor-generalship was an eventful period. After the defeat and death of Tippoo Saib [TIPPOO SAIB], his efforts were directed to the extension of the commercial intercourse of India, and to the commencement of those important financial reforms which eventually raised the revenue of the Company from seven to upwards of fifteen millions annually. In 1801 he was involved in warlike operations. In that year he despatched a force up the Red Sea to assist in wresting Egypt from the power of France. He next turned the British arms against the Mahrattas, conquered the whole country between the Jumna and the Ganges, and compelled Scindia and the rajah of Berar to make peace. Sir Arthur Wellesley's victory of Assaye, and the crowning battle of Lassawaree, terminated the war. Lord Wellesley, who had been long desirous of returning to Europe, was at last allowed, in 1805, to resign his government, and he embarked in August. He was well received by the government and the East India Company; but complaints were raised that he had been guilty of oppression towards the native powers, especially the nabob of Oude, and articles of impeachment were presented against him (without effect) in the House of Commons.

He now again took part in the proceedings of Parliament. He had no great sympathy with the opposition, but was far from being a strenuous supporter of Mr. Perceval's government, or even, at a subsequent period, of Lord Liverpool's. In 1807 he declined to become a secretary of state in the duke of Portland's cabinet. In 1808 he rendered ministers efficient service by his vindication of the expedition to Copenhagen. He was soon afterwards appointed ambassador to Spain. On the death of the duke of Portland he was recalled, and accepted the appointment of secretary of state for foreign affairs under Mr. Perceval. He held this office from December, 1809, till January, 1812.

After the assassination of Mr. Perceval, in May, 1812, he undertook to form a coalition government: but he soon found that the undertaking was hopeless, and resigned his charge. On July 1, when Lord Liverpool had announced himself at the head of the ministry, Lord Wellesley brought forward in the House of Peers a motion favourable to Roman Catholic claims, similar to that which Mr. Canning had carried a few days earlier in the House of Commons. It was lost by only one vote, and that vote a proxy. He continued for ten years to offer a modified opposition to government. In December, 1821, he accepted the appointment of lord-lieutenant of Ireland, which he continued to hold till March, 1828. His arrival was the signal for an outburst of the fiercest party spirit. The Orangemen of Dublin insulted him in the theatre; the southern counties became the scene of insurrectionary movements; and it was found necessary to have recourse to an Insurrection Act and other coercive measures. The earl of Liverpool's retirement had no effect upon the position of Lord Wellesley, for both Mr. Canning and Lord Goderich were favourable to the Roman Catholic claims. But the first declaration of the duke of Wellington upon the subject left the lord-lieutenant no alternative but to resign.

In 1831 he was appointed lord-steward under Earl Grey. In September, 1833, he resigned that office, and was once more appointed lord-lieutenant of Ireland. On Sir Robert Peel's brief accession to office (1834-35) the marquis retired, though urged by his brother to remain. He accepted the office of lord-chamberlain on the formation of the second Melbourne ministry, in April, 1835, but resigned it in the course of the same year. He died at Kingston House, Brompton, September 26, 1842.

Some Latin poems by him were published early in life. His despatches, &c., while in India and Spain have been published (1836 and 1838) by Mr. Montgomery Martin. He also wrote a number of occasional pamphlets.

WELLINGTON. [SHROPSHIRE; SOMERSETSHIRE.]

WELLINGTON. [NEW ZEALAND.]

WELLINGTON, ARTHUR WELLESLEY, DUKE OF, K.G., Field-Marshal, one of the greatest generals that not only England but Europe has ever produced, was the third son of Garrett, first earl of Mornington, and brother of the illustrious statesman and Indian governor-general, the Marquis WELLESLEY. He was born at Dangan Castle, county of Meath, May 1, 1769, that is, in the same year as Chateaubriand and Humboldt, Soult and Napoleon. After a short curriculum at Eton, he was removed to the military college at Angers, where he distinguished himself by the correctness of his conduct. Before he was eighteen he was appointed to an ensigncy in the 73rd regiment of foot, and in a few months removed to a lieutenancy in the 76th. His connections being influential, his promotion was rapid, and so early as 1793 we find him a lieutenant-colonel in the 33rd foot. He had scarcely attained his majority when parliamentary honours were added to his military successes. He was returned to the Irish House of Commons as member for Trim.

As colonel of the 33rd, he embarked in 1794 to join the duke of York's army in the Netherlands, and was employed in covering the retreat from Antwerp to the coast; a duty which he discharged with energy and prudence. In February, 1797, he landed with his regiment at Calcutta, and was immediately despatched by his brother, the governor-general, to reinforce the army of the Carnatic, under General Harris. He was subsequently engaged in all the operations that led to the reduction of the Mysore; at the battle of Malavelly, March 27, where his skilful movements largely contributed to the victory; and at the capture of Seringapatam, May 4. He was afterwards appointed to a separate command, and in 1800 took the field against a noted Mahratta freebooter, Dhoondiah Waugh, who was defeated and slain. Scindiah, another and more powerful Mahratta chief, assuming a hostile attitude against the British government, Wellesley was despatched to chastise him. The campaign opened with the siege and capture of Ahmednuggur. Crossing the Godavery, the British general came up with the Mahratta host, nearly 50,000 strong, and supplied with ninety guns, on the plain of Assaye; and though he had only 4500 foot and 2000 cavalry, of whom not a third were British, he immediately attacked them, September 23, 1803, and won a complete victory; the enemy left 1200 dead upon the field, and all his cannon. Fortress after fortress then submitted to the conqueror; and Scindiah himself humbly sued for a truce. Soon after had it been granted, however, before the treaty was signed, Mahratta united with the rajah of Berar, and both chiefs concentrated their forces on the plains of Argaum. By a rapid forced march the British commander-in-chief took them, delivered a formidable attack, and scattered them to the winds, November 29th.

This great defeat, and the capture of Gawil Ghur, a rocky fortress which the natives believed to be impregnable, compelled both Scindiah and his ally to humble themselves before British power, and peace was concluded on very favourable terms, the Indian Company receiving a large accession of territory. Wellesley's extraordinary services were rewarded with a K.C.B., and the thanks of both houses of Parliament.

In 1805 he returned to England, and in November of the same year commanded a brigade in Lord Cathcart's Hanoverian expedition. In 1806 he married the Honourable Miss Pakenham. Shortly afterwards he was employed in the mixed political and military movements which checked Napoleon's designs upon Persia, and terminated in the occupation of Copenhagen, 1807. His services were again acknowledged by a vote of thanks in both houses of Parliament. In 1806 he had been elected M.P. for Rye; he now sat for Newport, Shrewsbury, on his appointment in April, 1807, as chief secretary for Ireland; and in 1808 was returned for Newport, in the Isle of Wight. To the discharge of his official duties he brought that straightforwardness of purpose, clearness of thought, and capacity for business which were peculiarly his characteristics. But the range of his intellect fitted him to excel in the field rather than in the council, and his appointment to the command of a British force designed to assist in the expulsion of the French from the Iberian peninsula

opened up to him a career worthy of his surpassing military genius.

At the head of 10,000 troops, chiefly raw recruits, Wellesley landed at the mouth of the Mondego River in August, 1808; entered Leyria on the 10th, and having been joined by a small reinforcement of Portuguese, pushed forward against the French invading army, under Junot. On the 17th he defeated their advanced guard, 5000 strong, at Roliça; and on the 21st, their main body, commanded by Junot in person, at Vimiera. The French loss on this occasion amounted to 3000 killed and wounded, and thirteen pieces of cannon. As Wellesley was preparing to reap the fruits of his victory, he was superseded by General Sir Henry Burrard, who in his turn gave place to General Sir Hew Dalrymple; and this officer, a man of courage but of little capacity, nervously incompetent to any great responsibility, concluded with Junot the Convention of Cintra, by which the French were permitted to evacuate Portugal with all their plunder, public and private. This shameful treaty awoke a storm of indignation in England. Wellesley returned home to undergo an examination before a committee of inquiry, appointed by Parliament, and was honourably acquitted; but a severe vote of censure was passed upon the unfortunate Sir Hew Dalrymple.

On the death of Sir John Moore, Wellesley was appointed to the chief command of the Peninsular army, and immediately entered upon a series of well-planned operations, which are described in all their details in his 'Despatches and Letters,' and eventually carried the British arms in triumph across the Pyrenees. Even at this early period his sagacity had detected the internal weakness of the splendid fabric of Napoleon's power, and he looked forward with confidence to the period when Europe would be relieved from its oppressor. He never bated one jot of heart or hope throughout his arduous Peninsular campaigns, though hampered by the misgivings and incompetence of his superiors at home, by the insufficiency of the means most grudgingly placed at his disposal, by the scarcely concealed hostility of his Spanish colleagues, and too often by the clamour of faction and the violence of party spirit in England. With a devotion to duty which almost amounted to enthusiasm, he calmly advanced in the path he had laid down for himself, and year after year wrested the most brilliant victories from the finest troops and best generals of France, proving himself second to none among modern conquerors in coolness of judgment, promptitude of decision, and fertility of resource.

Wellesley arrived at Lisbon on the 22nd of April, and immediately moved upon Oporto, then occupied in force by one of Napoleon's ablest lieutenants, the illustrious Soult. He had with him about 16,000 troops. Soult had destroyed all the bridges, and seized all the boats, but the British general contrived to secure three large barges, and on the night of the 12th of May carried his army across the Douro, which at this point is broad, swift, and deep, and drove the French out of Oporto with heavy loss. This operation is justly considered one of the most brilliant passages in modern military history.

The British next advanced upon Madrid, to effect a junction with the Spanish army. At Talavera he was met by the French, commanded by Marshal Victor and General Sebastiani, and strongly posted. They mustered 43,000 foot, 7000 cavalry, and eighty guns. The allies, under Wellesley, were 54,000 strong, but 34,000 were Spanish, and being led by incompetent officers, worse than useless. When the French made their attack on the 27th of July, the Spanish, after one voluble discharge of musketry, took to their heels and fled. The British, however, opposed so stern a resistance that no ground was lost, and after a day's hard fighting, both armies retained their respective positions. On the following day the battle was renewed, but owing to Wellesley's masterly manœuvres and the courage of his troops, it brought no good fortune to the enemy, who retired under cover of the night, with a loss of 944 killed, 6294 wounded, 156 prisoners, and seventeen guns. The total loss of the allies was 800 killed, 3913 wounded, and 652 missing. The victory, however, was rendered fruitless by the incapacity of the Spanish government, and the feebleness of its officers. With his half-starved troops Lord Wellington (he had been elevated to the peerage for his services at Talavera) could attempt no forward movement, and he could secure no effective assistance from the Spanish forces. The junction of Soult, Ney, and Mortier menaced him with an attack in the rear from their powerful army, and he was constrained to fall back towards Ciudad Rodrigo.

Early in 1810 Marshal Massena assumed the command of the French army in Portugal—a splendid force of 65,000 men, well officered, well equipped, and excellently supplied. He commenced the campaign by investing Ciudad Rodrigo, which Wellington was too weak to relieve. His formidable advance then constrained the British general to fall back upon Busaco, where he planted himself on a rocky ridge, and awaited the approach of his enemy. Massena, on the 27th September, made two vehement attacks, but in each was repulsed with great slaughter. A loss of 4500 men taught him that the heights of Busaco were inaccessible. Wellington then leisurely retired to the famous lines of Torres Vedras, which he had been quietly engaged in constructing for some months, and where, with the sea for his base, and a series of fortifications in his front, armed with 232 pieces of cannon, and extending 22 miles, he was literally impregnable. Massena arrived before the lines on the 7th of October. Their amazing strength discomfited him, and after a few sanguinary skirmishes, he abandoned all hopes of carrying them by assault. Nevertheless, he continued watching them throughout the cold and dreary winter, until he had wholly exhausted all the surrounding country, and was reduced to a state of famine; while the English were supplied by sea with abundant stores. On the 6th of March, 1811, he abandoned Santarem, and commenced a retreat whose horrors can hardly be paralleled in the annals of war, although it was conducted with a masterly skill which military critics have freely recognized. He was sorely harassed by Wellington, who followed close in his rear, and inflicted upon him some loss at Redinha (March 11), Cazal Nova (March 12), Foz d'Aronce (March 13), and at Sabugal (April 3).

On the 5th of April the French re-crossed the Spanish frontier, thus terminating the third invasion of Portugal in disaster and shame. Wellington immediately invested Almeida, which Massena, now largely reinforced, resolved to save. He therefore re-entered Portugal on the 2nd of May, with 40,000 foot, 5000 horse, and thirty guns, and attacked Wellington in his position at Fuentes d'Onoro (May 5). The battle was gallantly contested, but terminated in the retreat of the French, who had upwards of 3000 men put *hors-de-combat*. Almeida was compelled to surrender, and Badajoz was then invested. The junction of the forces of Marshal Soult with those of Marmont, who had succeeded Massena in

his command, compelled the British, however, to raise the siege and retire upon Campo Major. The French had 70,000, and Wellington only 56,000, but they had learnt by this time to respect the genius of the British general, and the solid courage of his troops. They did not venture an attack, but separating their forces, Marmont withdrew in the direction of Salamanca.

Wellington then laid siege to the formidable fortress of Ciudad Rodrigo, which he carried by assault, on the night of the 19th of January, 1812, making the garrison prisoners. For this achievement he was raised to an earldom. He next invested Badajoz, and though it was bravely defended, successfully stormed it on the 6th of April. The carnage on both sides was terrible; the Allies alone lost nearly 5000 men. In June, Wellington directed his operations against Salamanca, forcing Marmont back upon the Douro, and after a succession of the most skilful manœuvres, which showed he was no less a master of tactic than of strategy, defeating the French in the pitched battle of Salamanca, July 22, and winning one of his completest victories. 'I never saw an army,' said Wellington, 'receive such a beating!' Forty thousand men were put to the rout in forty minutes, with the loss of eleven guns, two eagles, stores, ammunition, 12,000 killed and wounded, and 7000 prisoners. The loss of the Allies did not exceed 700 killed and 4000 wounded. Marmont lost an arm, and four French generals were slain.

The victor was rewarded with the order of the Golden Fleece, and advanced to a marquisate in the British peerage, while a sum of 100,000*l.* was voted for the purchase of an estate to be settled on him, his heirs, and his successors. He visited Madrid, and afterwards Cadiz and Lisbon, being everywhere received with an enthusiastic welcome. An unsuccessful attempt to capture Burgos closed the campaign of 1812.

In the following May he again advanced into Spain, and at Vittoria, on the 21st of June, gained another splendid victory over the French, who were commanded by King Joseph Bonaparte in person, assisted by Marshal Jourdan. The enemy lost 151 pieces of cannon, all their ammunition, their treasure, their stores, their papers, 1000 prisoners, and 9000 killed and wounded. The French army was completely demoralized, and this one great battle virtually delivered Spain from their oppression. Well had Wellington won the field marshal's baton which was now presented to him. His long-meditated plan of operations had been successfully carried out. He had recaptured almost all the important fortresses of Spain, and gradually forced back the invaders towards the frontiers of their own country. He now continued his advance with amazing celerity, the French rapidly retiring before him, and by a series of successes obtained command of the Pyrenean passes. Napoleon made a great effort to arrest his progress, reorganized, re-equipped, and reinforced his army, and placed at its head his ablest marshal, Soult, duke of Dalmatia. Wellington, meanwhile, blockaded Pamplona and invested San Sebastian. An attempt to carry the latter by assault, July 25, unfortunately failed, owing to the immense strength of the defences; but on the 28th and 30th Soult was totally defeated at Sauroren, in the Pyrenees, and having lost 15,000 killed and wounded, and 4000 prisoners, swiftly retreated into France.

The siege of San Sebastian was then resumed, and the town stormed on the 9th of September. Pamplona also surrendered, and no strong fortresses being left in his rear, Wellington was free to undertake the invasion of France. In October he crossed the Bidassoa. (
the 10th of November he defeated Soult on the Nivel
capturing 1400 prisoners; again defeated him at Bayon
and forced the passage of the Nive, December 10 to 1
and on the 27th of February, 1814, a third time defeat
the French marshal (at Orthes), and crossed the Ad
The minor engagements at Aire and Tarbes was follow
by the successful passage of the Garonne; and on t
10th of April he consummated his unsurpassed series
triumphs by repulsing Soult under the very walls
Toulouse.

The allied Russian, Austrian, and Prussian arm
having now entered Paris, and forced Napoleon to s
his abdication, the war was at an end. Wellingt
proceeded to Paris, where the allied sovereigns recei
him with the most marked respect. On the 2nd of M
he was created Marquis of Douro and Duke of Wellin
in the British peerage, and an additional grant
400,000*l.* was voted to him. For the twelfth time
received the thanks of both Houses of Parliament,
on his arrival in England the people seemed utt
unable to give due expression to their enthusia
admiration.

He now took his seat for the first time in the Ho
of Lords. In July he was appointed ambassa
extraordinary to the court of France, and immedia
afterwards appeared at the Congress of Vienna as
representative of his sovereign. While the Congress
still in session, intelligence arrived of Napoleon's es
from Elba and re-appearance in Paris, of the fligh
Louis XVIII., and the re-establishment of the Emp
The allied powers immediately denounced Napoleo
an outlaw, and declared war against him. The c
mand of the British forces on the Continent was intru
to their beloved general, who hastened to Brussels,
prepared to defend Belgium against the advance of
French. The operations which followed, and wh
gloriously terminated in the victory of the 18th
June, are described in our article WATERLOO.
Allies after this signal triumph marched upon P
virtually unopposed, and Louis XVIII. was reste
Wellington was then appointed to the command of
army of occupation, and resided in Paris from 181
1818. He incurred some obloquy by refusing to e
his influence on behalf of Marshal Ney, who, in defi
of the terms of pacification, was brought to trial
high treason, found guilty, and shot. Two atte
were made upon his life, but both happily failed.

Honours and rewards were now lavished on the g
general. The king of the Netherlands created
Prince of Waterloo. Foreign orders were showered
him; statues were raised to his honour in the Br
metropolis; 200,000*l.* was voted by Parliament for
purchase of the estate of Strathfieldsaye, in Hampsh
and he was appointed master-general of the Ordna
On the coronation of George IV., in 1821, he effec
as Lord High Constable of England. In the follo
year he attended the Congress of Vienna as the Br
plenipotentiary. In 1826 he repaired to St. Peters
on a special embassy, and prevailed on the Emp
Nicholas to act with England in mediating betw
Turkey and Greece. On his return he received
lucrative post of constable of the Tower, and in 1
was appointed commander-in-chief of the British a

A man of such rank could not fail to play an
portant part in the political arena; but though
career as a statesman exhibited in the strongest
his integrity, his sense of duty, and his moral cou
he had been too long bred in camps to acquire a pe

rapport with the feelings and sentiments of the great masses of his countrymen, and his ministerial services did not add to his reputation. His political opinions were those of a rigid Tory, yet, on coming into power as prime minister in 1828, he was forced to accede to the popular demands, and introduce liberal measures, whose expediency he had strongly condemned. He repealed the Test and Corporation Acts, under pressure; and to avert, as he said, a civil war in Ireland, carried the Catholic Emancipation Act. His conduct with respect to the latter measure excited much ill feeling among his supporters, and led to a ridiculous and bloodless duel between the 'hero of a hundred fights' and the earl of Winchelsea, March 21, 1829. It is worthy of note that, at a later period, he issued, as commander-in-chief, a stringent order against duelling in the army; whence we may conclude that he had learnt to appreciate the absurdity of that method of satisfying 'wounded honour.'

In 1830 the administration of which he was the head resigned, on account of the growing excitement upon the question of parliamentary reform, and for a time he was exposed to the greatest unpopularity. The windows of his London residence, Apsley House, were broken by the mob, and in the streets he was received with abuse and volleys of stones. The crown, however, showed its confidence in his integrity by appointing him lord warden of the Cinque Ports, and the people soon repented of their temporary ingratitude towards their 'Iron Duke.' In January, 1834, he was elected chancellor of the University of Oxford. In the same year he was summoned from his temporary retirement by William IV. to assist in carrying on the government of the country, and accepted the post of foreign secretary in Sir Robert Peel's administration.

In April, 1835, he quietly retired from official life, except with regard to his position as commander-in-chief (to which he was re-appointed in 1842); but his influence in Parliament and the country yearly increased, and in all difficult conjunctures his counsel was solicited and adopted. Honoured by his sovereign, beloved by his nation, his closing years, in their calm serenity, afforded a remarkable contrast to the stir and tumult of his early career. But he himself was unchanged and unchangeable, still the resolute, sagacious, self-reliant, self-controlling man, who flinched not at Assaye, and never despaired at Waterloo; never animated by any mean ambition, lust of power, or desire of aggrandizement; always inspired by an invincible love of order, and rigid obedience to what he believed to be the dictates of duty; always prompt, active, and decided; attached to social intercourse, simple to a Spartan severity in his habits, manly in every thought, English in every feeling, correct in discernment, accurate in judgment, fertile in resource, and vigorous in execution. Well may the poet bid an admiring posterity remember the great soldier—

> 'Who never sold the truth to serve the hour,
> Nor palter'd with Eternal God for pow'r;
> Who let the turbid streams of rumour flow
> Thro' either babbling world of high and low;
> Whose life was work, whose language rife
> With rugged maxims hewn from life:
> Truth-teller was our England's Alfred named;
> Truth-teller was our English duke;
> Whatever record leap to light,
> He never shall be shamed.'

Our resumé of his later years will necessarily be brief. In 1845 he had expressed himself doubtful of the policy of repealing the corn laws; but when convinced that the change was desired by the great body of the people, and that its delay would seriously embarrass the queen's government, he wisely withdrew his opposition, and co-operated with Sir Robert Peel in carrying through Parliament that most important legislative reform. In 1848 he aroused the supine indifference of his countrymen on the subject of national defences by his famous letter to Sir John Burgoyne; and, as commander-in-chief, directed the measures for the preservation of peace in the metropolis, during the Chartist outbreak of the 10th April.

On September 14, 1852, while residing at Walmer Castle, he was seized with an epileptic fit, and died the same afternoon. His remains were honoured with a public funeral, and after lying in state at Chelsea Hospital, were interred, on the 18th of November, in St. Paul's Cathedral, by the side of his rival in glory and patriotic devotion, Lord Nelson. He was succeeded in his titles and estates by his eldest son, Arthur, who also inherited the earldom of Mornington, and whose heir-presumptive is Henry Wellesley, son of Lord Charles Wellesley, deceased.

There are numerous biographies of the great duke extant. The best are Gleig's *Life*, and Brialmont's *La Vie de Wellington*, but in conjunction with these should be read the *Despatches*, and *General Orders*, as edited by Colonel Gurwood; and the *Despatches, Correspondence*, and *Memoranda*, now in course of publication by the present duke. For a general view of his career Wright's *Memoirs of the Duke of Wellington* may also be consulted, and an excellent estimate of his character has been translated, by the earl of Ellesmere, from the French of Jules Maurel. For his campaigns in Spain and Portugal, see Napier's *History of the Peninsular War*. The most important works relative to the campaign of 1815 are indicated in our article WATERLOO. Finally, so much of Wellington's career formed a part of European history, that its student must not neglect the historical writings of Thiers, Charras, Thibaudeau, Müffling, and Alison, nor the principal memoirs of the French marshals and their imperial master, Napoleon I.

WELLINGTONIA, a genus of naked seeded dicotyledonous plants, belonging to the natural order *Coniferæ*, or Cone-bearers. The giant Wellingtonia (*W. gigantea*) is a native of California, where it attains to an immense size. It varies in height from 250 to 320 feet, and from 10 to 20 in diameter. A specimen measured, at 5 feet from the ground, 20 feet 2 inches in diameter; at 18 feet, 14 feet 6 inches; at 100 feet, 14 feet; at 200 feet, 5 feet 5 inches. The bark of this tree was 12 to 15 inches thick. When the number of circles in a complete radius were counted, they were found to be 1120 in number. The cones were nearly 3 inches in length. (See Plate.)

WELLS. [ARTESIAN WELLS; SPRINGS.]

WELLS, an ancient city and bishop's see united with Bath, and a municipal and parliamentary borough in Somersetshire, 134 miles W.S.W. from London by the Great Western Railway, and 17 miles S.W. of Bath, is situated in a valley at the foot of the Mendip hills, near the source of the river Axe. The founder of the first church at Wells is said to have been Ina, king of Wessex, in 704. In the reign of Edward the Elder, in the beginning of the tenth century, the town became the seat of a bishopric, and the see was annexed to that of Bath in the reign of William Rufus. The writ of *congé d'elire* for the election of the bishop, is, however, still addressed to the dean and chapter of

Wells. Among the most celebrated bishops of this diocese have been Wolsey, Laud, and Ken. The cruciform cathedral, which is one of the finest structures of the kind in England, forms a prominent object as seen from all the great roads leading to the city. It is 437 feet in length, and the transept measures 135 feet. The tower, which is over the junction of the nave and transept, rises to an elevation of 178 feet; and two other massive towers, each 126 feet in height, crown the extremities of the west front. This façade is remarkable for its tracery and sculptured figures of apostles, bishops, kings, and popes. There are about 150 statues of the size of life, and above 300 others of smaller size; and although many of them are much mutilated, the effect is very striking. The present cathedral was begun in the early part of the reign of Henry III. The central tower was erected at the beginning, and the two western ones were added about the end, of the fourteenth century. The general character of the building is early English, with portions in the two later styles—these being very beautifully accommodated in their forms to the older parts. The Lady Chapel is considered by many to be the most perfect specimen of ecclesiastical architecture in this country. The whole of the interior of the edifice—which is richly decorated—has of late years been thoroughly restored. It contains several ancient, and other remarkable monuments, including the tomb of Ina, king of Wessex; besides which there is a handsome chapter-house, and cloisters. Close by are the bishop's palace and chapel, the latter restored in 1848. The residence is a castellated pile, on a space of seven acres, including the Great Hall—a ruin of the thirteenth century—and it is inclosed by a moat. The limits of the diocese are, generally, the boundaries of the county of Somerset; the episcopal jurisdiction extending over 462 benefices and 176 curacies. The dean and chapter have the patronage of nineteen livings. The bishop's salary is 5000*l.* per annum, and that of the dean 1000*l.*

The city also contains the parish church of St. Cuthbert, a large and handsome building in the later pointed style—its lofty square embattled tower being one of the most beautiful of the kind in England; a new church in the east of the town, dedicated to St. Thomas, which was opened in 1859, and is a fine structure, with a spire 130 feet high; and places of worship for the Independents, Methodists, and Baptists.

Wells has an air of great respectability and neatness. The streets are wide and well paved, and kept clean by streams of water running down their sides from a public conduit in the market-place. The latter is supplied from a spring near the bishop's palace, called St. Andrew's Well, from which the city derives its name. The chief non-ecclesiastical buildings are the town-hall, the market-house, Bishop Law's theological or training college, founded in 1840, two banks, a blue-coat school, new national schools, and several almshouses.

The only manufacture is that of brushes, but the town has a good market for the agricultural produce of a very fertile neighbourhood: and about 2 miles distant are some paper mills. There is excellent railway accommodation by the Great Western, Somerset and Dorset, South-Western, and Bristol and Exeter lines. Wells is the head of a county court, and the summer assizes are always held here. The courts of Quarter Sessions take place twice a year, being—like the assizes—held in this city alternately with Taunton.

The municipal borough is governed by four aldermen, one of whom is mayor, and twelve councillors. Until the passing of the English Reform Bill of 1867, th parliamentary borough returned two members; it wa deprived of one by that measure, and of the other b the Scotch Reform Bill passed in 1868. Populatio 4648. The environs of Wells are exceedingly pictu esque, and within a few miles are Glastonbury Abb and Tor, Cheddar Cliffs, and Wookey Hole.

WELLS. [Norfolk.]

WELLS, MINERAL. [Water.]

WELSH JUDICATURE. The Great Sessions i Wales was a court of special jurisdiction. The origin writ of the sovereign did not formerly run in Wales, as i still runs not into the counties palatine of Lancaster an Durham. Wales had its own separate courts, and legal process peculiar to itself. Before its conquest b Edward I., most of its laws could be traced to the con stitutions of one of its ancient princes called Howe Dah. Edward, having reduced the country to his ow yoke, divided certain of its districts into shires. He then caused the various Welsh laws as they existed in different parts of the country to be collected: abrogated and annulled some; amended others; added new one to them; and assimilated the whole to the English manner of executing justice. He caused to be devised certain briefs, writs, or *formulæ juris;* and instituted their manner of process, pleadings, and the course of their judicial proceedings. These matters are all fully treated of in a long Act made, 12 Edw. I. c. 5, entitled Statuta Walliæ, which sets forth that Wales was then incorporated with, and united to, England: and was for the future to be divided into certain counties, to have certain forms of trials, divisions of actions, &c.

Although the principality was divided into three provinces, North Wales, South Wales, and West Wales, yet, for judicial purposes, it was considered to consist of only two parts, North Wales and South Wales. A large part of West Wales was included in the shire of Pembroke, which was an earldom, and had palatine jurisdiction, and therefore is called in some of our ancient records, *Regalis Comitatus Pembrochiæ*. The provinces of North and South Wales were governed in this way:—The prince of Wales had, and used to hold, a chancery court and a court of exchequer in the castle of Caernarvon for North Wales, and stationed there a judge or justice, who ministered the law to all the inhabitants of North Wales. He was called the justice of North Wales. The like courts of chancery and of exchequer were held for South Wales in the castle of Caermarthen, where there was also a judge or justice. He was called the justice of South Wales. The courts thus held were designated the Great Sessions. Sometimes the justices were itinerant, and sat in each of the several counties of their different provinces. The functions of these courts were not confined merely to causes real, personal, and mixed, and with pleas of the crown concerning life and members. Sir John Dodridge says, that through them, upon the creation of any new prince, 'there were granted by the people of that province unto the prince, *nomine recognitionis ad primum adventum principis*, certain sums of money, as it were in acknowledgment or relief of the new prince;' which sums of money were called mises.

In addition to these courts there were held, in every shire, inferior ones, called county courts, or shire courts, or petty sessions. In some counties there were courts for causes of less moment and importance. Any wrong judgment pronounced by the inferior courts might be redressed by writ of false judgment in the superior court. And if any erroneous judgment were given in the Great

Sessions, which was the supreme court, that error was either redressed by the judgment of penal justices itinerant, or else in Parliament, and not otherwise in any of the courts of justice now at Westminster. As regards the Marches of Wales—which were held by such of the nobility of William the Conqueror as had, in accordance with his permission, wrested them from the Welsh—their government was somewhat different. They were ordained Baronies Marchers, and had a kind of palatine jurisdiction erected in every one of them. They administered a justice of their own, and their courts possessed peculiar franchises, immunities, and privileges. The ordinary writs of the king's courts were, for the most part, not current amongst them. At the same time, however, any dispute between two barons marchers had to be brought before the king as the supreme lord. This state of things was altered by the 27 Hen. VIII. c. 26. By this statute, uniting and annexing the principality and dominion of Wales to the realm of England, the former jurisdiction and government of Wales is altered, and the administration of its justice is assimilated to that of England. All Welsh laws, sinister customs, and tenures not agreeable to the laws of England, are for ever abrogated and abolished. Monmouth was annexed to England. Four new shires—Radnor, Brecknock, Montgomery, and Denbigh—were created. The object of their creation was to enable justice to be carried into the Baronies Marchers and undivided districts, where fearful crimes were perpetrated with impunity and without punishment, in consequence of the easy flight of the offenders from one border to another beyond its jurisdiction.

For the government of the Welsh provinces a special jurisdiction and officers were ordained. In all the new arrangements the English method of administering justice was, as far as possible, copied. The Act provided that one knight from every shire, and one burgess from every shire town, should be returned to serve in Parliament. The 34 and 35 Hen. VIII. c. 24, entitled 'An Act for certain ordinances in the King's majesty's dominions and Principality of Wales,' and containing some 130 clauses, dealt with the whole question of administering the law in that country. It ordained four circuits, and gave one judge to each. The chief justice of Chester had under his jurisdiction Denbighshire, Flintshire, and Montgomeryshire; the justice of North Wales had Caernarvonshire, Anglesea, and Chester; another justice (for whose appointment the Act provided) was to have jurisdiction in Radnorshire, Brecknockshire, and Glamorganshire; another was to have jurisdiction in Caermarthenshire, Pembrokeshire, and Cardiganshire. The justices were provided with 'letters patent and commissions for their offices under the king's seal of England.' Sessions were to be held 'twice in every year in every of the said shires.' They were to 'be kept and continued by the space of six days in every of the said shires.'

By the 18 Eliz. c. 8, her Majesty was empowered to appoint two justices to every circuit, 'there being so many great and weighty causes, matters, questions, demurrers, and ambiguities, as to render the administration of the law an infinite trouble' to the justices then appointed. The justices had almost the same jurisdiction on their circuits as the English judges had on theirs. They heard and determined all the criminal causes which would come under the designation of 'the pleas of the crown.' In these matters they had the same absolute power as was enjoyed by the judges of the King's Bench of that day. They had also jurisdiction over civil causes equally absolute with that then possessed by the Court of Common Pleas. They had also power to hear and determine cases of violence and outrages perpetrated within their respective jurisdictions. Every circuit possessed its own seal, with which to impress the original writs of 'summons and monition.' The seal serving for original process in Denbigh and Montgomery was ordered to be placed 'in the charge, keeping, and custody of the steward and chamberlain of Denbigh.' The seal of Chester was in the custody of the chamberlain of Chester. The seal of Caernarvon, Merioneth, and Anglesea was in the custody of the chamberlain of North Wales; that of Radnor, Brecknock, and Glamorgan was in that of the steward of Brecknock; that of Caermarthen, Pembroke, and Cardigan was in the 'usage of the chamberlain of South Wales.'

In reference to writs the chamberlains performed the functions of chancellors, and had power to issue them to under-receivers. 'Over and above the said original seals' there were four judicial seals. With these the justices were 'to seal all judicial process and bills' that were 'sued before' them. The justices of the four circuits retained these in their own keeping, and had, according to the 34 and 35 Hen. VIII., quoted above, to 'account and answer to the king's majesty for the profits.' The justices held their courts twice a year, and were required to give notice 'fifteen days at the least' before doing so, and to state the places at which they would sit. Their courts were to be opened for six days. Any cause which could not be concluded during that time was adjourned from session to session, according to their discretion. These sittings were called the *Great Sessions*. If there happened to be such 'multitude of pleas personal' as that they could not be tried at the Great Sessions, the issues then in trial might be tried at some other sessions before the deputy-justice. The sittings at such trials were called the petty sessions. An erroneous judgment in personal actions might be reversed by bill before the lord president of the Marches. In other cases the remedy lay in a writ of error before the King's Bench. On each of the circuits of the Great Sessions there were an attorney-general and a solicitor-general. The chamberlains to whom we have referred were the treasurers of the revenue of the courts, and the keepers of the seals of some of them. The pleadings, records, and judgments in civil cases were drawn and engrossed by the prothonotory; and indictments and proceedings in criminal matters by the clerk of the crown, both of whom were appointed by the king. In going to, and returning from, the sessions or court, and during their common sitting, the judges were attended by the marshal. The courts had also a cryer, whose appointment, like that of the marshal, was in the hands of the justices.

The 34 and 35 Hen. VIII. c. 26, provided that there should be justices of the peace in every shire in Wales, named and appointed by the chancellor of England, by commission under the 'king's great seal of England:' that they (section 67) 'shall and may keep their sessions, within the limits of their commissions, four times in the year, and at other times upon urgent causes, as justices of peace in England use to do.' The 26th section of the same Act provides 'that all mayors, bailiffs, head-officers of corporate towns in Wales, may hold pleas and determine actions, and do every other thing concerning common justice according to their lawful grants and landable customs of such towns, so always they follow the course, trade, and fashion of the laws and customs of the realm of England, and not of any Welsh laws or customs.' The same Act, in section 61, provided 'that

there shall be sheriffs in every of the said shires yearly appointed by the king's majesty.' Their duties were to be twofold, ministerial and judicial. In their ministerial office they were the ministers and executioners of all the process and precepts of the courts of law. They were required to 'accomplish and execute, without any favour, dread, or corruption, all manner of writs, process, judgment, and executions.' They had, also, authority to hold two courts of distinct natures. The one called Tourne, 'because,' says Sir John Dodridge, speaking of the sheriffs, 'he keepeth a tourne, or circuit, about his shire, holding the same in several places; wherein he doth inquire of all offences perpetrated against the common law, and not forbidden by any statute or Act of Parliament.' Their other court was the county court, wherein were determined all 'petty and small causes under the value of forty shillings.' The sheriff was required to appoint a sufficient number of persons as underwriters and bailiffs. For each of the two hundreds into which all the shires were divided, the justices appointed as high constables 'two substantial gentlemen or yeomen.' Every shire was provided with two coroners. There was yet another officer, the escheator, who was appointed by the lord treasurer of England, and whose duty it was to extend the king's revenue. He seized for his majesty all lands escheated, or unclaimed, and all goods and chattels forfeited. He was to 'inquire of the death of the king's tenants, and to whom their lands were descended, and to seize the lands and bodies 'for ward' of such persons as were within age.

The 34 Hen. VIII. c. 26, did not, however, apply to the marches of Wales, *i.e.*, those lands which, when the 27 Hen. VIII. c. 26 was made, were stated to 'lie between the counties of England and Wales, and not in any county,' and which are described in the third clause of that Act. The former Act provided that they, being 'lately come into the king's hands by the suppression of houses, by purchase of attainders,' and being at the time of the making of the Act, 'under the survey of the court of augmentations,' should be unaffected by its operation, and should possess 'only such liberties, franchises, and customs as be given and commanded to the lords of the same lordships, by force and virtue of an Act of Parliament made for Wales, in the 27th year of his grace's reign.' The marches were governed by a lord president and a council. The ordinary members of the council consisted of 'the chief justice of Chester, together with the three other justices of Wales. The lord president had power to call for the assistance of 'extraordinary' members from amongst those who were 'learned in the lawes.' And these members were 'allowed their diet for them and their men, and sixe shillings eightpence per diem during the time of their attendance. The jurisdiction of this council extended to 'such causes and matters' as were assigned to it by the king, in such manner as he prescribed by instruction signed with his hand. The court of Great Sessions was finally abolished by 11 Geo. IV. and 1 Will. IV. c. 70, and the Welsh judicature incorporated with that of England. This alteration was founded on the first report of the common law commissioners appointed in 1828. By the Act 2 Will. IV. c. 45, a new arrangement was made as to the return of members for Wales. Three of its counties were to send two knights of the shire to Parliament, and each of the remaining counties one. The eldest son of the reigning monarch is always created prince of Wales, and sits in the House of Lords as earl of Chester. By the 8 and 9 Vict. c. 11., the manner of assigning sheriffs in Wales is assimilated to the English custom.

WELSH LANGUAGE AND LITERATURE. The Welsh language, which is now and has been spoken in the principality of Wales as far back as historical records extend, is one of the Celtic family of languages. These languages are six in number; the Irish; the Gaelic of the Highlands of Scotland; the Manks, or language of the Isle of Man; the Welsh; the Cornish, formerly spoken in Cornwall; and the Armorican or Bas-Breton of the province of Lower Brittany in France. There has been much controversy as to the degree of affinity between these languages, but the view now generally adopted is to classify them into two great divisions:—1, the Irish, the Gaelic, and the Manks; 2, the Welsh, the Cornish, and the Armorican.

The name *Welsh* was first given to the people who speak it by the Anglo-Saxons, and the same term, or a similar one, seems to have been used in many of the Germanic and even of the Sclavonic languages to denote the Italians, or other nations whose languages resembled the Italian. *Welschland* was the name for Italy in German of the middle ages, and is not yet entirely superseded in the language of the common people. The name of that country in Polish is *Wlochy*, and the appellations of the Walloons and the Wallachians appear to be derived from the same root. According to Mr. Stephens, *Welsh* or *Walsch* is not a proper name, but a Teutonic term signifying 'strangers,' and the proper name for the Welsh people is *Cymry*. He also states that they are the last remnant of the *Kimmeroi* of Homer, and of the *Cymry* (*Cimbri*) of Germany, that great people whose arms struck terror into the Roman legions, and whose virtues Tacitus holds up for the imitation of his countrymen. From the Cimbric Chersonesus (Jutland) a portion of these landed on the shores of Northumberland, gave their name to the county of Cumberland, and in process of time followed the sea-side to their present resting-place, where they still call themselves Cymry, and give their country a similar name. The Welsh language is thus one of the oldest spoken languages in Europe, and there are poems in existence the origin of which is referred to the sixth century of our era. What is remarkable in these poems is the fact that the language of that early period is, after a very slight degree of study, really intelligible to those acquainted with the Welsh of our own day.

According to Ferdinand Walther, the Welsh language has great power, simplicity, and precision. It is very rich especially in roots, and has a remarkable capacity to express an entire abstraction in a single word. Its alphabet consists of thirteen simple and seven double consonants, and seven vowels with numerous diphthongs and triphthongs. The letter *c* has always the sound of *k*; *ch* is sounded gutturally as in the Scottish word *loch*; *dd* is equivalent to the soft sound of *th* in the English word *that*; *f* has the sound of the English *v*; *ff* of the English *f*; *ll* a peculiar sound, similar to that of the French *ll mouillé*; *u* and *y* that of the Italian *i* or English *ee*; and *w* of *oo* as in fool.

The grammar of the Welsh language is very intricate, owing to the number of the permutations it requires, *e.g.*, the word for 'father' is *tâd*; 'his father' is *ei dâd*; 'her father,' is *ei thâd*; 'my father' *fy nhâd*. In the same way *p* is changed into *b*, *mh*, and *ph*; *b* into *f* and *m*; *d* into *dd* and *n*, &c. There is one article, which is not declined, but varies according to the initial letter of the following word. There are but two genders, masculine and feminine. The verb has no present tense, to express which the future is used, or the substantive verb *wyv* ('I am') with the infinitive. There is, however, an

imperfect, perfect, pluperfect, and a future tense, which are formed both in the optative and indicative moods by endings and changes of vowels without auxiliary verbs; *e.g.*, *carwn*, 'I loved;' *cerais*, 'I have loved;' *carasen*, 'I had loved;' *caraf*, 'I shall love.' The personal pronouns are—*mi*, 'I;' *ti*, 'thou;' *ef*, 'he;' *hi*, 'she;' *ni*, 'we;' *chwi*, 'you;' *hwy* or *hwynt*, 'they.'

With regard to the affinity between the Welsh and the Irish and Gaelic languages, much light has been thrown by the researches of the Rev. Mr. Garnett, of the British Museum. On examining the monosyllabic words in the introductory portion of Neilson's 'Irish Grammar,' about 270 in all, he found of words perfectly identical with corresponding Welsh terms in sense and origin, 140; of words clearly cognate, forty; words derived from the Latin, Saxon, &c., repetitions, and compound terms, forty; words peculiar to the Gaelic, fifty. In the grammar prefixed to Armstrong's 'Gaelic Dictionary,' Mr. Garnett further adds, there is a list of about 200 verbs in common use, of which seventy, or more than one-third of the whole, are unequivocally cognate with Welsh and Armoric, and twenty more probably so. In Stewart's 'Gaelic Grammar' we have a list of twenty-four simple prepositions (omitting mere varieties of form), and about forty improper or compound. Of the former, fourteen are Welsh, and three Cornish; and of the latter eighteen, or nearly one-half, radically Welsh. Mr. Garnett concludes, therefore, that the affinity between the Welsh and these languages is analogous to that which exists between the German and the Icelandic.

The best dictionary of the Welsh language is that of Owen Pughe (3rd ed., 2 vols. 8vo, London, 1861), and good Welsh Grammars have been published by John Davies and the Rev. T. Rowland, of both of which several editions have appeared.

Literature.—The literature of Wales lays claim to a very early origin, and commences with poems ascribed to the sixth century. It is thus more ancient than that of any of the Teutonic or Sclavonic family of languages. Till the commencement of the present century most of these ancient compositions remained buried in the libraries of colleges or of private individuals, but in 1801 there was published at great expense by Mr. Owen Jones, a furrier in London, a work entitled 'The Myvyrian Archæology of Wales' (3 vols. 8vo), which contains the chief productions of Welsh literature from about 500 to 1400. This work was named after Myvyr, Mr. Jones' native place, and it was chiefly edited by two eminent Welsh scholars, Edward Williams and Dr. Owen, afterwards Dr. Owen Pughe. Mr. Jones also made manuscript collections for a further continuation of this work, which, however, still remain unpublished.

The history of Welsh literature may be divided into four periods—1, from the earliest times to the Norman Conquest in 1066; 2, from that period to the Reformation; 3, from the Reformation to the commencement of the reign of George III, in 1760; and 4, from 1760 to the present time.

1. The earliest Welsh author whose works are given in the 'Myvyrian Archæology' is Aneurin (510 to 560), whose poem, called 'Gododin,' detailing the adventures of the Ottadini (a tribe of the Cymry) before their immigration from Cumberland to Wales, justly entitles him to precedence among the bards of his time. After Aneurin follow Taliesin, Prince of Bards, from 520–570; Llywarch Hên, or Llywarch the Old, perhaps the most poetical of the Welsh bards, from 550–640; and Myrddin Wyllt, or Merlin the Wild, celebrated in romance, from 530–600. Besides these may be mentioned Gwyddno, Gwilym ab Don, Golyddan, and others of minor importance.

The authenticity of some of these early Welsh poems has been impugned by Pinkerton in his preface to 'Barbour,' and by Laing in his 'Dissertation on Ossian,' but has been maintained by Sharon Turner in his 'Vindication of the genuineness of the ancient British poems of Aneurin, Taliesin, Llywarch Hên, and Myrddin,' a work first published separately in 1803, and since appended to his 'History of the Anglo-Saxons.' Turner's views have been supported so far by Mr. Stephens and Mr. Nash, the former of whom considers only twelve poems out of the twenty-seven attributed to Taliesin to be genuine.

The earliest Welsh prose of unquestionable authenticity is the 'Code of Laws' of King Hywel Dda, or Howel the Good, who died in 748, after a reign of forty years. These laws were first published in 1830, in Watton's *Leges Wallicæ*, and subsequently in 1841, by the Record Commission. The only other prose work of the period of note is a collection of proverbs, attributed to St. Cadog, who flourished in the sixth century, but it is of doubtful authenticity.

2. The second period is from 1066 to the period of the Reformation, and the incorporation of Wales with England, in the reign of Henry VIII., in 1536.

During this period there flourished many bards, and the 'Myvyrian Archæology' contains the compositions of no less than fifty-nine of them, between the years 1120 and 1380. The compositions of Llywarch ab Llywellyn, a bard of a very superior order, and of Cynddelw Brydydd Mawr, or the Great Poet, who has enriched Welsh literature with nearly fifty meritorious productions, are well worthy of notice. By far the most popular poet of this period, however, is Davydd ab Gwilym, often called the Cambrian Petrarch, from his being the author of no less than seven score and seven poems addressed to his lady love. The great resemblance between the style of the compositions of this poet with that of the Scottish Burns has been generally remarked. A volume of translations from his poems by A. Johnes was published in London in 1834. Besides the poets mentioned above who flourished during this period were many others, but few of them of any note.

Among the prose authors of this period are:—Caradoc of Llancarvan, a monkish chronicler, who wrote the history of Wales from the year 1089 to his own time. He is said to have died in 1156, but his history is continued to the year 1196. Geoffrey of Monmouth (whose Welsh name is Gruffydd ab Arthur), archdeacon of Monmouth, afterwards bishop of St. Asaph, distinguished for his literary attainments, who wrote the famous 'Historia Britonum,' a work from which nearly all our great vernacular poets have drawn the materials for some of their noblest works of fiction and characters of romance.

To this period may be assigned the Welsh *Triads*, or maxims in triplets, each setting forth a historical event or a moral principle, said to be of Druidic origin; and the *Mabinogion*, or collection of tales written to wile away the time of young chieftains, and intended to be repeated at the fireside; now made accessible by the fine edition of them, in Welsh and English, published by Lady Charlotte Guest (1838–1849).

3. The third period, from 1536 to 1760, embraces two events which produced a great effect on the country, viz., the Reformation, and the incorporation of Wales with England by Act of King Henry VIII. in 1536. The first book printed in the Welsh language was an almanac,

with a translation of the Lord's Prayer, the Ten Commandments, &c. (1546), by William Salesbury, a zealous Protestant. He also published the first dictionary, English and Welsh, in 1547. The first translation of the New Testament into Welsh was made by this eminent man, and published in London in 1567. The translation of the whole Bible was completed by Dr. Wm. Morgan, vicar of Llanrhaiadr, Denbighshire, in 1588, who for this labour was made bishop of St. Asaph's. The first grammar of the Welsh language was printed abroad by Dr. Griffith Roberts in 1567; the second was published in London, in 1592, by Dr. John D. Rhys, under the title of 'Cambrobrytannicæ Cymræcaeve Linguæ Institutiones et Rudimenta,' a work which is still consulted. In 1603 a metrical version of the Psalms was published, which had been composed by William Myddelton, a captain in Queen Elizabeth's fleet. Myddelton was one of the first three persons who smoked tobacco in England, when crowds gathered to witness the phenomenon. His version of the Psalms is much esteemed, and was reprinted in 1827.

Among the few prose writers of the period of note may be mentioned Ellis Wyn, who, about 1700, wrote a moral and religious allegory called 'The Sleeping Bard,' a work of great originality and power. This was translated into English, in 1860, by George Borrow, author of 'The Bible in Spain.'

It is a circumstance worthy of remark that there was not a printing press in Wales until about the close of this third period of its literary history; the earliest press having been set up in Anglesea about the year 1754.

4. The fourth period of Welsh literature extends from 1760 to the present time (1868).

After the accession of George III. a great impetus was given to Welsh literature by the further development of the art of printing, the establishment of periodical papers, the institution of patriotic societies, and the spread of Methodism.

In 1764 attention was called to the subject by the publication of 'Some specimens of the poetry of the ancient Welsh bards translated into English' by Mr. Evan Evans, curate of Llanvair Talhaiarn. This remarkable work was suggested by the success which attended the publication by James Macpherson of Ossian's poems in 1760. Among the literary men of Wales who flourished during this period may be mentioned—Owen Jones, born in 1741, founder of the Gwyneddigion Society, at whose expense the 'Myvyrian Archæology' was printed; Dr. Owen Pughe, born in 1759, the great Welsh lexicographer, who, besides his dictionary, translated Milton's 'Paradise Lost' into his native tongue; Edward Williams, the friend of Southey, who wrote between 2000 and 3000 Welsh hymns, and published under the title of 'Salmau yr Eglwys yn yr Anialwch' (Psalms of the Church in the Desert); the Rev. Edward Davies, a distinguished antiquary, and author of the 'Mythology of the Druids,' &c.; the Rev. Thomas Price, author of the 'Hanes Cymru,' or History of Wales, a work of great original research; John Williams (ab Ithel), editor of many pieces of Welsh literature; Thomas Stephens, of Merthyr Tydvil, author of 'The Literature of the Cymry in the Twelfth and following Centuries;' D. W. Nash, author of 'Taliesin, or the Bards and Druids of Britain,' a translation of the remains of the earliest Welsh bards, and an examination of the bardic mysteries.

Among the poets of the same period whose works are generally of a serious character may be mentioned—David Richards, or Davydd Ionawr (1751–1827), author of a poem on the Trinity, and a paraphrase of the history of Joseph; David Owen, of Eivion (1784–1841), author of 'Blodau Arfon,' or Flowers of Arvon; Rev. Daniel Evans, author of the 'Gwinllan y Bardd,' or the Poet's Vineyard; Rev. W. Rees, author of a paraphrase on the Book of Job; the Rev. William Williams, author of 'Grawn Awen,' or the Treasure of the Muse; and the Rev. William Williams, of Pantycelyn, the most popular hymnist in Wales, and of whose entire works, prose and poetry, a beautiful uniform edition—the first ever issued—was published in 1868 by Mr. William Mackenzie, of Glasgow, and edited by the Rev. J. R. Kilsby Jones.

The periodical literature of Wales is of comparatively recent origin. A journal called *Yr Eurgrawn Cymreig*, the 'Welsh Treasure,' was first published in 1770. The *Seren Gomer*, or 'Star of Gomer,' was started in 1814, and still exists.

Among the periodicals devoted to Welsh subjects may be mentioned—'The Cambrian Register,' rich in original information, of which only three volumes appeared prior to 1818. 'The Cambro-Briton and General Celtic Repository,' also in three volumes, 1819-22. 'The Cambrian Quarterly Magazine,' in five volumes, 1829–33. 'The Cambrian Journal,' commenced in 1854; and 'The Archæologia Cambrensis,' a journal of the Cambrian Archæological Association, begun in 1846, are still published quarterly.

The more important societies that have been founded for the promotion of Welsh literature may be stated as follows:—The *Cymrodorion* (Associates), or Metropolitan Cambrian Institution (1751–81); The *Gwyneddigion*, or Society of the Men of Gwynedd or North Wales, established in 1771, by Owen Jones, by whose labours the *Eisteddfodau*, or 'Congress of Bards,' were revived, and which are still kept up, the last having been held on the 6th of September, 1867; The Society for the Publication of Ancient Welsh MSS., founded in 1827, but which, after publishing 'The Iolo Manuscripts,' the 'Lives of the Welsh Saints,' &c., has unfortunately come to a termination; The Cambrian Institute, founded in 1853, and presided over by Prince Louis Lucien Buonaparte, which publishes the 'Cambrian Journal' above referred to.

In those parts of the United States where emigrants from Wales have settled the Welsh is generally spoken, and many Welsh books and periodicals are published for their use.

For fuller information on this subject see the works of Owen Jones, Thomas Stephens, and D. W. Nash, above referred to, and an excellent article, 'Welsh Language and Literature,' in Knight's *English Cyclopædia*, Arts and Sciences, vol. 8, 1861.

WELSH-POOL. [MONTGOMERYSHIRE.]

WELSH RABBIT, or RAREBIT. Cheese toasted and laid in thin slices upon pieces of bread which have been toasted and buttered.

WEM. [SHROPSHIRE.]

WENDOVER. [BUCKINGHAMSHIRE.]

WENER, LAKE, the largest lake in the Scandinavian peninsula, and the largest in Europe, next to those of Ladoga and Onega, lies 150 miles S.W. of Stockholm, and about 30 miles inland from the Cattegat. In length it measures 90 miles, in extreme breadth 50 miles; it is 153 feet above the sea-level, 309 feet in greatest depth, and has a superficial area of 2005 square miles. It receives numerous small rivers, and among others the Klar, and discharges its surplus waters into the Cattegat through the channel of the Göta. A canal connects it with Lake Wetter, and inland communication is thus established between the Cattegat and the Baltic.

It abounds in fish. It is nearly divided into two portions by the peninsulas that stretch towards its centre, one from the northern, the other from the southern shore; and its banks exhibit a succession of pleasant landscapes.

WENHAM, a town of Massachusetts, in the United States of North America, 22 miles N.N.E. of Boston by railway, is celebrated on account of the excellence and great purity of the ice obtained at *Wenham Lake*, close by; from which, although it is only 1 mile square and 200 feet deep, about 30,000 tons are obtained every year, and exported to India and other countries. [ICE; MASSACHUSETTS.]

WENLOCK. [SHROPSHIRE.]

WENTWORTH. [STRAFFORD.]

WEOBLY. [HEREFORDSHIRE.]

WESEL. [DÜSSELDORF.]

WESER, the ancient *Visurgis*, a river of Germany, formed by the junction of the Werra and the Fulda. The *Werra* rises in the Thüringerwald, a few miles N.E. of the town of Hildburghausen. Its course is generally north-west, past Meiningen, across the principality of Eisenach, the eastern part of Hesse Cassel, and the province of Göttingen, where it joins the Fulda, after a course of 175 miles, about 100 of which are navigable. The *Fulda* rises on the north-western slope of the Rhöngebirge in Bavaria, drains the greater part of Hesse Cassel, in which it passes the towns of Fulda, Hersfeld, and Cassel, and joins the Werra on the Hanoverian frontier, after a northern course of about 100 miles; its largest feeder on the left bank is the Eder. The Fulda is navigable from Hersfeld. The Werra and the Fulda unite their waters under the walls of Münden, and from this point the river is navigable by boats. Hence, to its mouth in the North Sea, the course of the Weser is winding, but generally N.N.W. It drains the greater part of Hanover, in which it receives the Aller and numerous feeders, and after passing Bremen, forms the boundary between Oldenburg and Hanover, for a distance of about 40 miles. The length of the river from Münden to the sea is 250 miles. Its upper and middle portions are often rendered impassable in the summer by the sand-banks. Five miles below Bremerlehe a harbour is constructed at the mouth of the river, for the accommodation of vessels of large size. Those drawing 7 feet only can ascend to Bremen. A canal connects the river with the Elbe.

WESLEY, REV. JOHN, the founder of Methodism, was the second son of the Rev. Samuel Wesley, rector of Epworth, Lincolnshire, where he was born June 17, 1703. The eldest son was Samuel, who became an usher in Westminster School. John was sent to the Charter House, London, whence he proceeded to Christchurch, Oxford. The account of his official biographers, Coke and Moore, is, that having taken his degree of B.A., he was elected fellow of Lincoln College in 1724 (Southey says 1726), was ordained by Potter, then bishop of Oxford, afterwards archbishop of Canterbury, in 1725, and graduated as M.A. in 1726.

From his earliest years Wesley had been of a serious temper, and more especially from the commencement of his residence at college religious impressions had taken a strong hold on him. From about the time when he was ordained he began to keep a diary, a practice which he continued to the end of his life. A large portion of of it, under the title of his 'Journal,' was published by himself, and has been several times reprinted. It is a singularly faithful record of his mental impressions and religious feelings.

Shortly after his ordination he went to officiate as curate to his father at Wroote, and here he resided for about two years; during which time, in 1728, he received priest's orders. It appears to have been in the end of this year that he was summoned back to college, in consequence of a regulation that such of the junior fellows as might be chosen moderators should perform the duties of their office in person. Here he found his younger brother Charles, then an undergraduate of Christchurch, one of a small association of students already distinguished in the university by the derisive appellations of the Holy Club, the Godly Club, the Bible Bigots, the Sacramentarians, and the Methodists. John Wesley immediately joined this society, which now consisted of about fifteen individuals, of whom the most remarkable, besides the two brothers, were James Hervey, the author of the 'Meditations,' and George Whitfield, who shares with Wesley the fame of having been one of the chief founders of Methodism. [METHODISM.]

It was very soon after this event that John Wesley and his brother Charles became acquainted with William Law, the author of the 'Serious Call' and other similar works, whose conversation and writings, harmonizing in the main with their own previous notions and feelings, exerted a powerful influence over the two brothers. Meanwhile the less ardent or resolute of their Oxford associates dropped off one by one; and the number, which had at one time been twenty-seven, declined at last to five. A few months after his father's death John Wesley was induced to go out with General Oglethorpe to Georgia, in North America, to preach to the settlers and Indians in the colony which the general was founding there. He and his brother Charles, who now took holy orders, sailed from Gravesend October 14, 1735, in the same vessel with a party of twenty-six Moravians. They anchored in the river Savannah, February 6, 1736.

Charles Wesley returned to England, sent home by Oglethorpe with despatches, early in the next year. John Wesley returned to England in February 1, 1738. While he had been abroad, the religious excitement which now began to be generally known by the name of Methodism had made great progress in London, Bristol, and other parts of the south of England, under the impulse of the enthusiastic preaching of Whitfield, who had sailed from the Downs for Georgia only a few hours before the vessel which brought Wesley back cast anchor there. As soon as he arrived in London he hastened to renew his connection with the Moravians. It was not, however, till some months afterwards, that, according to his own account, he for the first time attained to true views of Christianity.

About three weeks after his 'new birth,' June 15, 1738, he set out for Germany to visit the Moravian brethren at their original seat of Herrnhut. He returned to England in September.

Whitfield came back to England in the latter end of the same year; and he and Wesley immediately again became intimately associated. The example of preaching in the open air, first set by Whitfield, February 17, 1739, was shortly after followed by Wesley at the same place, the neighbourhood of Bristol. The original meeting-house for the Methodists was commenced in the Horse Fair, near St. James' Church, Bristol, May 12 in that year. Lay preaching, of which the first example had been set by an individual named Bowers, in Islington churchyard, after a sermon by Whitfield, was, not without some hesitation, sanctioned by Wesley soon after his return to London in the autumn.

In July, 1740, he solemnly separated himself from

the Moravians, with whom he had now come to differ, or had discovered that they differed from him, on some fundamental points of doctrine. Henceforth his life was spent in preaching, travelling, writing books, and labouring in all other possible ways for the consolidation and extension of the new church, the management of which was now wholly in his own hands. Not an hour, scarcely even a minute, was abstracted from the service of the cause on which he had set his heart; and rarely has any ambition been so well seconded by the other qualities and habits of mind, and it may be added, of body too, necessary to sustain it and give it full effect. He rested nowhere, seldom riding less than 40, 50, or 60 miles a day; even on his journeys from place to place he read and wrote; and he generally preached three or four times, sometimes five times daily.

About the year 1750, soon after his brother Charles had become a husband, Wesley married Mrs. Vizelle, a widow with four children. The alliance turned out an unhappy one. Wesley, who had stipulated that he should not change his habits with his condition, was little at home. The end was, that after his wife had several times run away from him and been induced to return, she repeated the experiment once too often, and was not invited to come back.

Wesley died after a short illness at his house in London, March 2, 1791. His publications are far too numerous for us to attempt any account or even an enumeration of them. Among the most remarkable, besides his 'Journal,' are—a corrected translation of Thomas-à-Kempis, said to have been published by him in 1735, a short time before his departure for America; various collections of Hymns, most of which, however, were written by his brother Charles; a History of England; a short Roman History; 'Primitive Physic;' and many short tracts on theological subjects. There are at least two collected editions of his works: one in 32 vols. 8vo, printed immediately after his death; another in 16 vols. 8vo, printed in 1809. The *Arminian Magazine*, now called the *Methodist Magazine*, was established by Wesley in 1780, and was conducted under his superintendence as long as he lived. His life has been very fairly and eloquently written by Southey, and also by his executors Coke and Moore.

WESLEYAN METHODISTS are a body distinct from all other descriptions of Methodists [METHODISM], and claim to be the original community established by John Wesley. They have vastly increased in numbers since his death, not only in Great Britain but in foreign parts, their missionaries having left scarcely any habitable country in the world unvisited. The chief ecclesiastical court of the Wesleyan Methodist church is the 'Conference' (held annually) of 100 of its most eminent ministers, called the 'Legal Hundred,' by whom the whole affairs of the denomination and its various institutions are regulated and controlled. A new chairman, or 'president,' is chosen every year. On his election his predecessor hands over to him the 'insignia' of office, consisting of John Wesley's Bible, and other relics of the founder; and gives him charge of the official documents legally constituting the Conference the governing body of the denomination. Several secessions have taken place from the Wesleyans, and these have themselves grown into large and influential sects, such, for instance, as the Methodist New Connection, Primitive Methodists, and United Methodists. In each case the ground of separation has been disciplinary, and not doctrinal. If, instead of being thus divided, all the sections were united under one government, the Methodist communion would, it appears, exceed eleven millions of adherents. Of course this includes the United States, where this is the leading persuasion, and is based on what is found from careful inquiry to be a fact, that for every recognized and registered member at least three may be added as members' children or regular hearers. The total number of actual members of the Wesleyan Methodist Society in July, 1867, was 539,795, besides 42,873 on trial; number of ministers, 2674, and 498 on probation.

Their educational system is very extensive and efficient. There are in Great Britain 5137 Sunday schools, comprising 100,000 teachers and 556,502 scholars. The number of weekday schools is 631, in which there are 99,128 children. The total amount of government aid to Wesleyan day schools in 1866 was 28,592*l.*; the number of certificated teachers, 521; of pupil teachers, 619. There are several theological and training colleges, besides two schools for the education of ministers' sons.

WEST INDIES is a term applied to the archipelago which constitutes the eastern boundary of the Gulf of Mexico and the Caribbean Sea, and separates them from the Atlantic. The name was given to the islands by Columbus, who supposed he had reached the confines of India by a western route. It was for some time synonymous with America, until it was gradually restricted to its present signification. Geographers sometimes call these islands the Columbian Archipelago, as nearly all of them were discovered by Columbus himself. They extend from 10° to 27° 30′ N. lat., and from 59° 30′ to 85° W. long.; and are divided into three groups: the Bahamas, between 20° and 27° 30′ N. lat., and between 70° and 80° W. long.; the Great Antilles, between 18° and 23° 30′ N. lat., and 65° and 85° W. long.; and the Lesser Antilles, extending from 10° to 19° N. lat., and from 59° 30′ to 66° W. long.

The most northern portion of this archipelago, or that part which is north of 20° N. lat., rests on a great coral bank, which is intersected by arms of deep water. [BAHAMAS.] The extensive banks which surround the greater part of Cuba prove that this island also rests on a similar one to that of the Great Bahama. [CUBA.] The mountainous portion of Cuba evidently belongs to another region, which extends eastward through St. Domingo as far as the Virgin Islands. [HISPANIOLA; VIRGIN ISLANDS.] The strait lying between Virgin Gorda and Anguilla separates this district from the islands of volcanic origin, which extend from 12° to 18° 20′ N. lat., and between 60° 50′ and 63° 10′ W. long in a curved line. Tobago and Trinidad, which are still farther S., consist chiefly of primitive rocks. The West Indies thus vary greatly in structure and appearance. Many are bold and mountainous, while others are low and flat. Some of them exhibit both coralline and volcanic rock in alternate layers.

Climate and Productions.—All the islands, with the exception of the most northern Bahamas, are within the tropics; and their climate, as in other countries thus situated, is regulated by the progress of the sun, and the trade-winds, which depend on that progress. The year is divided into two seasons, the dry and the wet. In fact, all the islands which are S. of 18° N. lat. have two dry and two wet seasons, and this is also the case with the southern shores of Puerto Rico, Hayti, and Jamaica. On Cuba and the northern coasts of the other Greater Antilles and the Bahamas, the seasons are not so distinctly marked. The mean annual temperature is 78° Fahr. When the sun is in the southern hemisphere the West Indies enjoy the full benefit of the trade-winds, blowing from N.E. and E.N.E., and diffusing over them

a refreshing coolness. But when it has passed the equator, these retire to the northward as far as 15° or 16° N. lat., and are replaced by S.E. winds, which are hot, but usually gentle. The heat at this time is excessive in the low grounds at a distance from the sea, but near the coast refreshing breezes are felt in the afternoon, when they are most needed. Snow is never seen, even on the tops of the loftiest mountains; but there are slight frosts sometimes. The nights are exceedingly beautiful, owing to the transparency of the atmosphere. Hurricanes are frequent from August to October, and earthquakes occasionally occur. There were some most disastrous tornados, accompanied with shocks of earthquake, in November and December, 1867. Some of the islands are often devastated by yellow fever.

The currents which flow around the West Indies, and between them and the mainland, are described under ATLANTIC OCEAN, and under the names of the principal islands. The chief articles of cultivation are sugar and coffee, both introduced by Europeans. The first sugar was produced in Hayti. As early as 1518 the Spaniards had numerous sugar-presses in operation there. From thence the manufacture spread to the other islands. Coffee found its way to the West Indies from Ceylon and the Isle of Bourbon, about the middle or towards the latter end of the sixteenth century. The other more important productions are molasses, rum, pimento, tobacco, cotton, logwood, indigo, cochineal, mahogany, lignum-vitæ, various dyewoods, copper, and an immense variety of tropical fruits. The value of the exports of all kinds from the British West Indies alone amounts to 6,000,000*l.* per annum.

All the principal islands are described in separate articles, but the following table shows at a glance their estimated area, population, and the countries to which they belong:—

	Area in Square Miles.	Population.	Dominion.
GREATER ANTILLES.			
Caymanbrack, Cayman (Little), Cayman (Great),	—	200	British.
Cuba,	43,000	1,443,462	Spanish.
Hayti,	27,600	760,000	Independ't
Isle of Pines,	600	1,400	Spanish.
Jamaica,	6,400	441,225	British.
Porto Rico,	4,000	603,181	Spanish.
LESSER ANTILLES.			
Windward, or South Caribbee Islands.			
Barbadoes,	166	152,727	British.
Grenada,	125	31,900	
Grenadines,	—	—	
Martinique,	380	121,478	French.
St. Lucia,	270	26,705	British.
St. Vincent,	132	31,755	
Trinidad,	2,400	84,438	
Tobago,	970	15,410	
Leeward, or North Caribbee Islands.			
Anguilla,	35	2,934	British.
Antigua,	183	36,412	
Barbuda,	75	1,900	
Desenda,	—	—	French.
Dominica,	275	25,065	British.
Guadeloupe,	534	129,050	French.
Marie Galante,	60	12,749	
Montserrat,	47	7,645	British.
Nevis,	50	9,882	
Saba,	15	1,617	
St. Bartholomew,	35	1,800	Swedish.
St. Christopher,	108	24,440	British.
Saintes (Les),	5	1,100	French.
St. Eustatius,	190	1,903	British.
St. Martin,	30	7,773	French & Dutch.
Virgin Islands.			
Anegada,	13	—	British.
Culebra,	18	300	Spanish.
Santa Cruz,	110	25,600	Danish.
St. Jan,	42	2,560	
St. Thomas,	45	12,800	Un. States
Tortola,	—	5,000	British.
Vieque (Bieque),	—	211	
Virgin Gorda,	20	—	
BAHAMA ISLANDS.			
Abaco (Great & Little), Andros, Crooked Islands, Eleuthera, Exuma (Great & Little) Great Bahama, Inague (Great & Little) Key or Cayco (Great), Long Island, Mariguana, New Providence, Providenciales, St. Salvador, Watling Islands,	United area estimated at 3000 square miles.	Population estimated at 33,000.	British
SOUTH AMERICAN COAST.			
Buen Ayre,	80	1,955	Dutch.
Coche,	—	—	Venezuela
Curagua or Cubagua,	—	—	
Curaçoa,	250	15,164	Dutch.
Margarita,	50	15,000	Venezuela
Oruba,	—	—	Dutch.
Tortuga,	—	—	

Inhabitants.—The original inhabitants of all the West Indies are extinct, with the exception of a few families of Caribs on the islands of St. Vincent and Trinidad. The present population is composed of whites and negroes (the former imported from Europe, and the latter from Africa), and the offspring of these two races. In the British West India Islands the negroes constitute about three-fourths of the population. In Hayti both races are so mixed that the bulk of the people are considered mulattoes.

Since the abolition of negro slavery in the British West Indies in 1834, coolies from India and liberated Africans have arrived there to assist in cultivating the sugar estates. Slavery was abolished in the Dutch possessions on the 1st July, 1863.

WESTBURY. [WILTSHIRE.]

WESTERAS. [SWEDEN.]

WESTERHAM. [KENT.]

WESTERN AUSTRALIA, in its widest acceptation, extends over the western portion of the Australian continent, and lies between 14° and 35° S. lat., and 113° and 129° E. long. The length is 1280 miles, and the breadth 800 miles.

We are particularly acquainted only with that portion of it in the S.E. where a British colony has been settled, and which was for many years known as the *Swan River Settlement.* This is about 600 miles in length from N. to S., and its average breadth is 150 miles. The remainder of the territory is only inhabited by a few natives, and much of it is very imperfectly known.

A range called the Darling mountains extends S. to N. nearly the whole length of the colony, at a distance from the coast varying from 15 to 50 miles, and rising from 800 to 2000 feet above the level of the sea. They contain roofing-slate, limestone, marl, selenite, iron ore,

government should be tried for a year; but it was never conclusively established in England by legislative authority; and even what was done by the Parliament in partial confirmation of the proposals of the Westminster Assembly of Divines, was regarded as invalid at the Restoration, when episcopacy resumed its authority without any Act being passed to that effect.

WESTMORELAND, a north-western county of England, bounded N.W. and N. by Cumberland, S.W. and S. by Lancashire, S.E. and E. by Yorkshire, and N.E. by Durham. It lies between 54° 10′ and 54° 42′ N. lat., and between 2° 9′ and 3° 10′ W. long. The greatest length, N.N.E. to S.S.W., is about 41 miles; the greatest breadth, at right angles to the length, 32 miles. The area is 485,432 statute acres. The population in 1861 was 60,817 (30,701 males, and 30,116 females), which was an increase of 2530, or 4 per cent., since the previous census. The number of inhabited houses in the county in 1861 was 11,793; 616 were uninhabited; and seventy were being built.

Surface and Geology.—This county is probably the most mountainous in England, and consequently the landscapes everywhere exhibit a grandeur and a wild picturesque beauty which have made them the familiar inspiration of our artists and great poets. The eastern side is traversed by the grand Pennine chain, which forms the boundary between it and Yorkshire; the western side and the centre are occupied by the mountains of the Cumbrian group, which are separated from the Pennine chain by the valley of the Eden, and stretch in a lofty and romantic range from Helvellyn, the highest mountain in Westmoreland (3055 feet), to Bow Fell.

The principal ridge of the Pennine chain enters the county to the south of Cross Fell, and extends across Milburn Forest S.S.E. by Brough to the border of Yorkshire in Arkengarth Forest; it then turns S.S.W., and runs, above Kirkby Stephen, to the head of the Eden. On each side of the ridge numerous transversal valleys are drained by small streams: those on the west side flowing into the Eden; those on the east forming the upper waters of the Tees, the Swale, and the Ure or Yore. One of the highest summits of the Pennine chain is the Nine Standards, which rises to an elevation of 2136 feet.

The main mass of the Cumbrian group crosses the county on the S. from E. to W., beginning near the Nine Standards, at the head of the valley of the Eden, by which it is separated from the Pennine chain. It extends, as already stated, to Bow Fell (2911 feet high), whence it continues to the shores of Ullswater and the valley of the Lowther. Some of its peaks attain a considerable altitude, as at Loughrigg Fell, and display a bold variety of outline. The glens shut in amongst them are very lovely, and surprise the traveller with a constant succession of new and agreeable pictures. Two small groups of lesser elevation in the S.E. form the boundaries of the narrow basin of the Lune.

Geologically the county may be regarded as consisting of three districts. The slate rocks of the Cumbrian mountain group compose the first division; the formations of the great carboniferous and mountain limestone series of the north of England, of which the Pennine chain represents the western outcrop, constitute the second; and the new red sandstone of the valley of the Eden forms the third. Granite occurs in the north, particularly at Shap, where large brilliant crystals of red felspar have been found. Graphite is obtained in large quantities at Borrowdale; and the mineral treasures of Westmoreland also include coal, lead, copper, marble, and slate.

Rivers and Lakes.—The Pennine chain of mountains separates the waters pouring into the Irish Channel from those which flow into the German Ocean. Westmoreland is chiefly on the western side of the mass; but a small portion is on the eastern, and it is here that the upper waters of the Tees have their principal source. All the streams belonging to the eastern slope of the Pennines have scarcely any part of their course in the county, as the ridge which determines the watershed lies very near the eastern border.

On the western side of the Pennines Westmoreland is divided by the principal ridge of the Cumbrian groups into two basins. On the N. lies that of the Eden; on the S. the basin of Morecambe Bay is drained by the Kent, the Lune, and other streams, which flow into that noble estuary.

The Eden rises on the border of Westmoreland and Yorkshire, on the side of Hugh's Seat, one of the Pennine mountains. Its course for the first 2 miles is S.; it then abruptly turns to the N., flows N. past Kirkby Stephen, and afterwards N.W. past Appleby into Cumberland. [CUMBERLAND.] Its extent in Westmoreland is 30 miles; in Cumberland about the same; making a total of nearly 60 miles. It is nowhere navigable in the former county.

The Eden receives several affluents, the chief being the Eamont, which flows from the Cumbrian mountains into Ullswater at its upper end, and crossing the lake empties itself into the Eden. Its total length, including Ullswater, is about 30 miles. About 4 miles above its junction with the Eden it receives the Lowther. Ullswater, an expansion of the Eamont, is about 7 miles long, with an average width of half a mile. Hawes-water is formed by the Mardale Beck, an affluent of the Lowther.

The Lune, the Kent, and the Winster, drain the basin of Morecambe Bay. The Lune rises on the northern side of the ridge which connects the Cumbrian mountains with the Pennine chain. It flows N., then W., and afterwards S., partly in the county, partly on the border, to Kirkby Lonsdale, entering Lancashire a little below that town. No part of its course of 27 miles is navigable. The Kent rises in the Cumbrian mountains, and flows by the town of Kendal into Morecambe Bay. Its whole course of 23 miles belongs to Westmoreland: it is not navigable. The Winster, also called the Pool, rises in this county, and flows along its border by Lancashire into Morecambe Bay.

The large lake of Windermere, which is so celebrated for its beauties, and enjoys an imperishable renown in the poetry of Wordsworth, and the poetic prose of 'Christopher North,' lies partly in Westmoreland and partly in Lancashire. [LANCASHIRE.] Ullswater, scarcely less famous for its wild sylvan character, forms the boundary between this county and Cumberland. [CUMBERLAND.] A short distance N.W. from the head of Windermere lie the beautiful small lakes of Grasmere and Rydal Water, which have been lovingly described by Wordsworth and Southey; and in the vicinity several tarns, or very small lakes, are situated, belonging mostly to small valleys or circular recesses. Loughrigg Tarn is perhaps the most romantic.

Railways and Canal.—A railway extends from Lancaster through Kendal and Penrith to Carlisle, in connection with the London and North-Western system, and a branch from Kendal runs to the eastern side of Windermere. The only canal is the Lancaster, which connects Kendal with Lancaster and Preston.

Agriculture.—Although Westmoreland from its

mountainous nature, is more interesting in a picturesque than in an agricultural point of view, it contains some very fertile valleys, in which occur many well-cultivated farms. The climate is mild and moist in the low grounds: the high hills condense the clouds which traverse the Atlantic, and cause frequent and abundant rains. These keep the pastures green, but are not so favourable to the ripening of the corn. The average rain-fall is about 60 inches per annum. Great quantities of snow accumulate in winter. The mountainous surface is only fit for sheep-pastures or for plantations of timber trees.

The soil in the valleys is mostly a dry gravelly loam, composed of different earths washed down from the hills, and well adapted for the cultivation of turnips, of which great crops are raised on well-managed farms. Towards the east and north the soil is more inclined to clay; and unless this be well drained, the land is too wet, in spring and autumn, to admit of clean and careful tillage. There are some extensive moors in the county—its original name was 'West-moor-land'—and wherever the water has no sufficient outlet, basins of peat accumulate; but these are not so extensive as in many other hilly countries, owing to the calcareous rocks which form the substratum of a great part of the hills. These, being porous, prevent the accumulation of moisture, except in those districts where the lakes are situated, which render this county of such interest to the artist and the lover of the picturesque.

From Kirkby Stephen to Brough and Appleby, and thence to Temple Sowerby, the soil is a deep sand, which in a dry country would be very unproductive; but the moist climate of Westmoreland renders it more compact on cultivation. Turnips and potatoes grow well when manure is abundantly supplied. Lime, a great improver of the soil, fortunately abounds in the county. Near Kendal a great breadth of potatoes is planted, for the supply not only of the immediate neighbourhood, but also of the adjacent counties, and many thousand loads are annually sent into Lancashire and Yorkshire.

Grass land being abundant, and the climate favourable to pastures, the Westmoreland farmer chiefly confines his attention to the breeding of large cattle. Good meadows let at a high rent, and are carefully manured with composts. Large crops of hay are procured in favourable years. Geese are reared in great numbers in the mountain districts, and some of the lakes contain an abundance of fish. Less than one-half of the entire area—viz., 221,950 acres—is under cultivation; and of these 166,366 are permanent pasture, meadow, or grass land, only 21,986 acres being devoted to corn, and but 11,312 to green crops. In 1867 wheat was grown on 1889 acres; barley on 2932; oats on 16,977; rye, beans, and peas on 188; potatoes on 1771; turnips and swedes on 8493; mangold and vegetables on 512; vetches on 536; and clover, &c., on 20,052; while 2234 acres were bare or lying fallow. The number of sheep in the county in the same year was 328,328; of pigs, 6466; and the stock of cattle was returned as 50,653.

Divisions and Towns.—Westmoreland is divided into four wards and thirty-two parishes. It is in the diocese of Carlisle, and in the Northern Circuit. The assizes are held at Appleby. It returns two members to Parliament, and the borough of Kendal one. It has the lowest average population of any English county: with the exception of Kendal, no town contains 2000 inhabitants.

The following are the principal towns, with the population in 1861:—

Ambleside, a market town and chapelry, in the parish of Grasmere, 14 miles N.W. from Kendal, is situated in a beautiful valley near the northern extremity of Windermere, and on the little streamlet Rothay, or Raisebeck. It is laid out in a rambling irregular manner, which, however, combines with the peculiarities of its situation to impart to it a highly picturesque character. In the immediate vicinity many handsome villas and houses are situated, each in its own breadth of 'blooming garden-ground.' The chapel, in the highest part of the town, is a plain but commodious building, rebuilt in 1812. The free school was founded in 1721. Ambleside is a place of considerable resort for visitors to the lakes of Cumberland and Westmoreland, and has some good inns. Woollen cloth is manufactured, but not to a great extent. Population of the chapelry, 1603.

Appleby. [Appleby.]

Brough, a market town, 23 miles N.E. from Kendal, is divided by the Helbeck, a small feeder of the Eden, into two parts, respectively designated Market Brough and Church Brough. The houses are plain, but tolerably commodious, and built of stone. The church is large, but of indifferent architecture, mostly in the late perpendicular character: it has a square embattled western tower. There are also dissenting places of worship. The inhabitants are principally employed in the neighbouring lead and coal mines. In the forest of Stainmore, near this town, was erected the cross which marked the boundaries of England and Scotland, as determined by William the Conqueror, and Malcolm, the Scotch king. Population of the township, 840; of the parish, 1728.

Burton-in-Kendal, a market town, 10 miles S. by E. from Kendal, is well built, and has a respectable appearance, though many of the houses are old. There is a spacious market-place, with a stone cross in the centre. The church is an ancient building of plain architecture, with a square tower. There are several charities, a grammar-school, flax mills, and a market, numerously attended. Population of the parish, which extends into Lancashire, 2118.

Kendal, or more accurately *Kirkby-Kendal*, a market town and municipal and parliamentary borough, is the largest and most important town in Westmoreland. It is situated in the midst of productive orchards, chiefly on the slope of a hill rising from the right or west bank of the Kent, 22 miles S.S.W. of Appleby, and 252½ N.W. of London by the North-Western Railway. One principal street, a mile in length, runs nearly parallel to the course of the river, which is spanned by three stone bridges; another street, branching from this, leads to the northernmost of the three bridges, and connects the town with a suburb on the east bank. The houses in the principal thoroughfares are built of limestone and roofed with blue slate, and have a remarkably clean and neat appearance; many of those in the narrow lanes opening into the main streets are old structures, of rough stone plastered. The church is chiefly of late perpendicular character, and remarkable for its unusual width. It has a low tower. The town also contains a chapel of ease, rebuilt in 1841, on the east bank of the Kent; another church, erected in 1837; several dissenting meeting-houses, and a Roman Catholic chapel; a town-hall; a house of industry; a free grammar-school, endowed with six university exhibitions; mechanics' institution, museum, and a house of correction. On the east side of the river are some ruins of the old castle of the barons of Kendal, which was the birthplace of Catherine Parr, one of the queens of

Henry VIII. The Castle-How, or Castle Law Hill, an ancient earthwork, is on the west bank, almost directly opposite the castle. On the summit stands an obelisk erected in commemoration of the Revolution of 1688. Considerable manufactures are carried on at Kendal of cotton checks, kerseys and other woollens, linsey, blanketing, fancy waistcoating, carpets, girths, hosiery, sacking, doeskins, tweeds, Guernsey frocks, and worsted. There are also tanneries, corn, paper, gunpowder, and other mills, and some rather extensive marble works. Kendal was made a market town by license from Richard I., and became, by the settlement of the Flemings, under a certain John Kempe, in the reign of Edward III., the seat of a considerable manufacture of woollen cloths (anciently known as Kendals). It is still a very busy and prosperous place, with a large weekly market for corn and provisions. It has a station on the Lancaster and Carlisle Railway, and the Lancaster Canal terminates in the town. The municipal borough is divided into three wards, and governed by six aldermen, one of whom is mayor, and eighteen councillors. Its limits are co-extensive with those of the parliamentary borough, which returns one member: population, 12,029. Registered electors in 1866, 439.

Kirkby-Lonsdale, a market town, 12 miles S.E. from Kendal, is situated on the west bank of the Lune, over which is an ancient stone bridge of three lofty arches. It consists of several streets, the three principal meeting in a central market-place. The houses are well built of freestone and roofed with slate. The church is large, divided into four aisles or portions by three rows of pillars, with a square tower 68 feet high. There are also dissenting places of worship, and a free grammar-school. In the market-place is a curious antique cross. The manufactures are of coarse woollens, linens, calicoes, and ginghams. The family of Lowther derive their earldom of Lonsdale from this town. Population of the township, 1727.

Kirkby-Stephen, a market town, 23 miles N.E. from Kendal, stands on the left bank of the Eden, and consists principally of one street parallel to the river. The houses are generally good, and built of stone. The church is a large early English building, with a square tower. The town also contains two dissenting chapels, a grammar-school, and a modern market-house. Population of the township, 1715.

Milthorpe, a market town, 8 miles S. by W. from Kendal, with a station on the Lancaster and Carlisle Railway, stands on the north bank of the river Beba, near its entrance into the estuary of the Kent, and consists chiefly of one long street nearly parallel to the river, over which, at the lower end of the town, is a bridge of one arch. The houses are tolerably well built. There are an episcopal chapel, with a pinnacled tower, several schools, a flax mill, a ropery: and in the neighbourhood are some good limestone quarries. Small vessels, by the help of the tide, ascend the river to the town. Population of the township, which is in the parish of Heversham, 1433.

Orton, a market town, 14 miles N.N.W. from Kendal, consists chiefly of one irregular street, situated on a gentle acclivity. The church is an ancient building, with a low embattled tower. There are also a grammar-school and a dissenting chapel. Population of the township, 1615.

Shap, a small market town, 16 miles N. by E. from Kendal, with a station on the Lancaster and Carlisle Railway, stands on an affluent of the Lune, and consists of one long street, extending along the road from Lancaster by Kendal to Carlisle and Glasgow. The church retains some ancient parts amid many alterations. picturesque ruins of an abbey which formerly here still remain on the west bank of the stream a mineral spring of some value, on the high moor tract of Shap Fell, one of the dreariest spots in the dom, is much patronized by visitors. Population parish, 991.

History and Antiquities.—In the earliest historical period this county appears to have been included in extensive territory of the Brigantes. Upon the gation of South Britain by the Romans, it was included in the province of Maxima Cæsariensis. Eden, with its estuary, the Solway Frith, is supposed the Ituna (Ἰτούνα) of Ptolemæus, and the Bay of Morecambe the estuary of Moricambe (Μοριάμβου τοῦ of the same writer.

A number of Roman inscriptions have been found Westmoreland, several of which are preserved in Hutchinson's 'Britannia Romana.'

Westmoreland was probably conquered by the Saxons of Northumbria, under Egfrid, about 685. After in the Northumbrian kingdom, it underwent the vicissitudes, though probably saved from the ravages war by its mountainous character. Its name, as 'Moringaland,' occurs but once in the Saxon Chronicle. After the Norman Conquest it was divided into baronies of Westmoreland and Kendal, and a castle erected in the latter locality. Few references to found in our early annals, except that it suffered sionally from the inroads of the Scotch borderers. earldom of Westmoreland was created by Richard II. favour of Ralph Neville of Raby: it was forfeited Charles Neville, who was one of the leaders of the rising in the north against Queen Elizabeth, as turesquely described by Mr. J. A. Froude, in his 'History of England.'

The castles of Appleby, Kendal, Brough, Burgill, and Brougham, with Shap Abbey, are the principal mediæval buildings. Of Brougham Castle, the seat late venerable politician and orator, first Baron Brougham and Vaux, the remains are considerable. The keep standing, but all the inner apartments are destroyed except one vault, whose roof is formed of groined supported by an octagon pillar in the centre.

In the civil war of Charles I. Appleby Castle occupied by a royalist garrison, but after a vigorous resistance, was eventually compelled to surrender. influence of the Lowther family has for the last two turies been paramount in the county, and its annals in fact, indissolubly blended with those of its ancient and powerful lords.

There are some memorials generally regarded Druidical. On the waste near Helton, between rivers Lowther and Eamont, stands a remarkable right stone called Helton-Copstone, and about a of a mile to the north of it lies a circle of stones yards in diameter, known as the Druids' Cross. Another circle, 21 yards in diameter, called the Cock-Stones situated at the head of Ellerbeck, in the neighbourhood of Ullswater. There is a circle 70 feet in diameter formed of large stones, on Lowther Scar: and near Shap may be seen the remains of two convergent lines of masses of unhewn granite, called Carl Lofts. Pennant who has described this curious relic of a very remote antiquity, assigns it to the Danes: but it is more probably, of Celtic origin. In Gunnerkild Bottom, near Shap, a circle of stones, named the Druids' Temple, has certainly been used for a place of sepulture: and in several localities some similar memorials have been discovered

TPHALIA, *a Province of Prussia*, situated
50° 43′ and 52° 30′ N. lat., 6° 25′ and 9°
ong., has an area of 7786 square miles, and in
population of 1,666,581. It is bounded W. by
; N. by Hanover; E. by Hanover, Brunswick,
sse-Cassel; and S. by Hesse-Cassel and the
Provinz. The inhabitants are pure Germans, and
more than half of them are Roman Catholics.
t of the province N. of the Lippe belongs to the
ain of northern Germany, and has no mountains
speaking, though some low eminences run from
e to the Weser and to the Porta Westphalica,
through the district of Minden into Osnaburg.
face to the south of the Lippe presents small
f mountains and hills, which contain many
In the north the soil is in general sandy and
ated, with extensive heaths and morasses, and
orests: in the south it is firm, and sand is rare;
it is not always productive, although the forests
fine. The E. contains vast plains covered with
The mountains are all offsets of the Hartz. To
long—the Weser range: the *Teutoburgerwald*, a
ble chain which forms part of the watershed
the Weser, the Ems, and the Lippe, and is
with fine forests of oaks and beeches: and the
birge, a beautiful picturesque line, extending
neighbourhood of Osnaburg, through the district
n, to the Steinhuder Lake in Lippe-Schaumburg.
er has broken through this chain, about 4 miles
linden, thus forming the celebrated pass called
estphalica. The principal rivers are the WESER,
, the Lippe, the Röhr, and the Vechta, but none
are navigable in this province. There are
s marshes in the north. The climate is tem-
nd healthy. Agriculture, mining, and cattle-
are the chief occupations of the inhabitants.
cattle, sheep, and pigs are numerous. The
e products are corn of all kinds—but especially
h is largely consumed both by men and animals
es, peas, beans, garden vegetables, fruit, hemp
tobacco, hops, and timber. As a rule the grain
is of an inferior kind. The minerals are—iron,
ead, calamine, marble, slate, freestone, salt, and
ere are extensive turf-moors and numerous salt-
The manufactures include linen, cotton, woollen
k, leather, hosiery, tobacco, and paper. There
erous iron, copper, and steel works, and manu-
of all kinds of cutlery and copper, brass, and iron
There are also many sugar refineries, brandy
es, and tanneries in the province. The commerce
products and in the celebrated Westphalian hams
ant. The peculiar flavour of the latter is im-
y curing them over fires made with twigs of the
The Cologne-Minden Railway, with branches
ter and Paderborn, traverses Westphalia, and
it with Berlin, Hanover, Hamburg, and Bremen.
ince is divided into three districts, ARNSBERG,
, and MÜNSTER, under which heads further
rs are given.

POINT, the site of the United States Military
, is situated on the right bank of the Hudson,
N. of the city of New York. The natural
of the place led to its selection for a fortress in
lution; and Fort Putnam, erected at that period,
owns a hill of 598 feet elevation above the river,
ding a fine view, is surrounded on three sides
ravines and steep descents. The buildings of
emy occupy a plateau elevated 188 feet above
son, and covering an area of about 1 mile in
circuit, with ample room for the necessary structures, military evolutions, and the practice of gunnery. The approach from the river on the E. is interrupted by a nearly perpendicular bank or wall, while on the W. and S.W. the place is defended by a rampart of high and rugged hills. The Military Academy was established by Congress in 1802, and is wholly supported by the general government. The education given is gratuitous, so far as money is concerned; but each cadet must give eight years' service to the government, unless released sooner. The corps of cadets must not exceed 250 at any one time, and the candidates for admission must not be under sixteen or over twenty-one years of age. Each member of Congress has the right to nominate one cadet from his district, and the president appoints ten. The corps must spend three months of each year in encampment. The course of study, which is full and thorough in the mathematics, and all that pertains to the military art, embraces five years.

WESTPORT. [MAYO.]

WESTRINGIA, a genus of plants belonging to the natural order *Lamiaceæ*. All the species are natives of New Holland.

WETTER, LAKE, in Swedish Gothland, is next in importance to Lake WENER, from which it lies about 25 miles S.E., and with which it is connected by a canalized series of small lakes. It receives no less than ninety small tributaries; its outlet is the river Motala, which falls into the Baltic. The scenery surrounding it is of a very picturesque character, and its surface is agreeably diversified by several small islands Its dimensions are—70 miles in length, 13 in breadth, and 370 feet greatest depth. Lying 300 feet above the level of the Baltic, it occupies an area of 850 square miles. Its navigation is impeded by a singularly rapid and violent undulation, which occurs at intervals, and whose cause is not accurately ascertained. It is also subject to alternations of level; but its waters are remarkable for their emerald colour and surprising transparency. [SWEDEN.]

WETTERHORN (*i.e.*, 'peak of storms'), a limestone mountain of the Bernese Oberland, 11 miles south-east of the lake of Brienz. Its height is stated at 14,105 feet. It is remarkable for its savage and romantic aspect.

WEXFORD, a maritime county in the province of Leinster, in Ireland, is bounded E. by the Irish Channel, S. by the Atlantic Ocean, S.W. by Waterford Harbour, W. by Kilkenny, N.W. by Carlow, and N. by Wicklow. The greatest length N.E. to S.W. is about 54 miles; the greatest breadth E. to W. is about 30 miles. It lies between 52° 6′ and 52° 48′ N. lat., and 6° 8′ and 7° 1′ W. long. The area is 901 square miles, or 576,616 acres, of which 510,702 are arable, 45,501 uncultivated, 14,325 in plantations, 2392 in towns, and 3668 under water. The population in 1861 was 143,954, of whom 130,103 were Roman Catholics.

Coast Line.—The whole line of coast from Arklow (which lies a little N. of the northern boundary of Wexford) to Wexford Harbour, presents no opening which can afford shelter from foul weather, except to small craft; and the danger to shipping is increased by a range of sand-banks which lie parallel to the shore at the distance of a few miles. The navigation of Wexford Harbour is intricate and dangerous; and it is, moreover, obstructed by a bar. From Roslare Point, on the S. side of the entrance to Wexford Harbour, to Greenore Point, the coast forms a bay, called Greenore Bay. From Greenore Point, on the S. side of the bay, to Carnsore Point (which is the south-eastern extremity of Ireland, being about 50 miles from St. David's Head,

in Wales), the coast trends S. by W. It then changes its direction, and runs E. to W., including two small bays before it reaches Crossfarnogue Point, W. of which are Ballyteige and Bannow Bays. From Bannow Bay to the E. point of Waterford Harbour it runs S.S.W. On this last part is the small harbour, used by fishing vessels, called Fethard Bay. Off the S. coast are numerous rocks and islets. On some of them lighthouses are erected; but they, nevertheless, often prove very fatal to shipping in bad weather. Several lagoons skirt the S. shores.

Surface, Rivers, Geology, and Climate.—Waterford Harbour and the river Barrow separate Wexford from Waterford and Kilkenny. At the point of junction of the counties of Carlow, Wexford, and Kilkenny, the boundary is distinctly marked by the ridges called Blackstairs mountains and Mount Leinster, the former of which rise to elevations of from 1520 to 2409 feet above the level of the sea, while the latter has an elevation of 2610 feet. Three remarkable summits upon the mountains between Wexford and Carlow, are known as 'The Leaps of Ossian's Greyhounds.' A few miles W. by S. of Newtownbarry, on the slope of Mount Leinster, rises the small river Clody, which forms the boundary of the county to Newtownbarry, where, after a rapid course, it falls into the Slaney. From hence the boundary line runs for a short distance up the course of the Slaney, after which it passes along the tributary river Derry to a point a little beyond the junction of the counties of Carlow, Wexford, and Wicklow.

Besides the ridges that form part of the natural boundaries of the county, Wexford contains many hills of considerable elevation, among which are the Forth mountains, extending 5 or 6 miles from the neighbourhood of the capital, towards the S.E. corner, where the surface gradually declines to a level peninsula. The principal river of Wexford is the Slaney, which enters it from Carlow a short distance north of Newtownbarry, and flows past that town and Enniscorthy to Wexford Harbour. It is navigable for large boats as far as Enniscorthy, to which place the tide flows. The Barrow is noticed under BARROW. The other rivers are small, as are also all the lakes in the county.

Geologically considered, the district forms part of the clay-slate tract that extends along the eastern portion of Ireland from the northern part of Wicklow to the Atlantic Ocean. The clay-slate is found in immediate contact with granite, which forms the chief component of the ranges that separate this county from Carlow. The Forth mountains consist principally of quartz rock, with occasional laminæ of clay-slate. Granite appears about Carnsore Point and at a few other places, and greenstone and porphyry also occur. Limestone is the chief mineral product. Small quantities of lead and copper have been found, but the mines proved unprofitable, and are now closed.

In climate, those parts of Wexford which lie open to the sea are milder in temperature than the adjacent counties of Carlow and Kilkenny. Snow seldom remains on the ground in these districts, and agricultural operations may often be carried on without interruption, while lands 10 miles inland are locked up with frost.

Soil, Agriculture, and Manufactures.—The soil is generally of a cold clayey nature, being deficient of a substratum of limestone and limestone gravel; and, generally speaking, the western or inland parts of the county are inferior in quality to the eastern or maritime portions, although the former have an equivalent for the inferiority of the land in the abundance of turf or peat, which affords fuel for burning the limestone obt from the neighbouring counties. The agricultu Wexford is generally in a creditable state, consi the natural disadvantages of the soil; and the in has a very pleasing appearance when the many furze hedges put forth their yellow blossoms. crops consist of the various kinds of grain, of barley is the principal, beans, tares, rape, turnips potatoes, the last being the staple crop, and that which most manuring is bestowed. Considerable tities of butter, barley, cattle, pigs, poultry, and are exported. The South-Eastern Railway is pro throughout the county, passing Gorey and Ennis to the capital.

The great extent of sea-coast and the num banks in the vicinity render the fisheries of W very important to its population. The coast pr numerous creeks, at which fishermen reside; but are no harbours suitable for large vessels.

The manufactures of the county are of little in ance. Woollen cloths, checks, and coarse linen made, but on a small scale, and for home use onl

Divisions and Towns.—Wexford is divided in baronies. It is in the united diocese of Ossory, and Leighlin, with a small portion in that of D Wexford is the county town, where the assizes are The county returns two members to Parliament tered electors, 6450), and the boroughs of Wexfo New Ross one each.

The following are the principal towns, wit population in 1861:—

Enniscorthy, a market town, 14 miles N. by W. Wexford, by railway, is situated on both sides o Slaney, at the head of its tide navigation. Barg considerable size come up from Wexford with timber, &c., and return with agricultural pro There are two quays, and a bridge over the river. more ancient and principal part of the town stan the side of a steep hill, the houses rising irreg above each other. The principal buildings are a c house, market-house, union workhouse, handsome large modern Roman Catholic chapel, built from designs of Pugin, a convent, meeting-houses for Q and Methodists, two branch banks, a brewery, flour mills, and numerous corn stores. There is a trade in corn and other agricultural produce. centre of the town is clean and orderly, and has respectable houses, but the suburbs consist of cabins. The scenery in the vicinity is beautiful. strong Norman castle, to which the place owe existence, is still entire, though it was originally e about the end of the twelfth century. At one p it belonged to Spenser, the poet, to whom it was gra by Queen Elizabeth. Enniscorthy was captured by rebels in 1798, but they were finally defeated at Vi Hill, about 12 miles distant, and many of them executed in retaliation for the atrocities they had c mitted in the town of Wexford. Population of E corthy, 5396.

Ferns, a decayed town, 17½ miles N. of Wex with only 586 inhabitants, contains picturesque r of an abbey, and a modern cathedral. It was a bish see, comprising the whole of Wexford, until united Ossory and Leighlin in 1835.

Fethard, 16 miles S. from New Ross, is situate a small inlet of the sea running up from Bannow B and has a lobster fishery. The town, which is resor to for sea-bathing, consists principally of one m street, and contains an ancient church. Population 5

Gorey, a market town, 30 miles N. by E. from Wexford by railway, consists chiefly of one street, nearly a mile long. It contains a court-house, a large Roman Catholic chapel, with a nunnery attached, in the pointed style, a spacious parish church, a Methodist chapel, several schools, a market-house, and a union workhouse. The place is of some antiquity, having obtained a charter of incorporation from James I. In municipal matters it is governed by nine commissioners. Population, 2673.

New Ross, commonly called *Ross*, a market town and parliamentary borough, 14 miles N. from Waterford, and 83 miles S.S.W. from Dublin, is situated on the E. side of the estuary of the Barrow, here a fine deep stream, which contains the united waters of the Nore and Barrow. A wooden bridge 510 feet in length, and with a portcullis in the centre to allow vessels to pass, connects New Ross with the village of Rossbercon on the opposite side. The older parts of the town are seated on acclivities of the banks, and are very irregular. The modern portions occupy the strip of comparatively flat land by the side of the river: here the streets are regular, and the houses respectable. Ross contains a court-house, two churches, two Roman Catholic chapels, four or five places of worship for dissenters, some monastic establishments, hospitals, a market-house, barracks, custom-house, &c. There are breweries and tanyards in the town, but no manufactures. The trade of the port is rather extensive, but for want of railway communication it does not increase much. Ships of 200 tons can discharge at the quay (which is 650 yards long) at low water, and those of 800 tons at high spring-tides. Vessels of small tonnage can proceed beyond the town by the Nore to Inistiogue, and by the Barrow to St. Mullins, and barges still farther to Athy, where the junction of the river with the Grand Canal affords a water communication with Dublin on the one side, and Limerick on the other. The principal exports are grain, flour, wool, butter, fowls, and bacon. The number of vessels registered as belonging to the port in 1867 was ten (1807 tons). The entries in 1866, chiefly coastwise, were 569 (53,704 tons), and the clearances, 396 (34,157 tons). The customs revenue received at the port in 1867 was 25,224*l*. Above and below the town there is a salmon fishery, which has greatly improved since the Salmon Fisheries Act, 26 & 27 Vict., came into operation. The number of men employed in it now exceeds 800. The management of the corporate property is vested in fifteen commissioners, under the 'Towns Improvement Act,' (1854). The population within the municipal limits is 6567; in the parliamentary borough, which is partly in Kilkenny, 7132. The number of electors in 1866 was 194, who have one representative in the House of Commons. The town is very ancient, and was fortified in the thirteenth century. Its situation is picturesque, being in one of the most beautiful parts of the county.

Newtownbarry, a market town, 22 miles N.W. from Wexford, is situated on the S. bank of the river Clody, close to its confluence with the Slaney. A western suburb, with which Newtownbarry is connected by a wooden bridge over the Clody, extends into the county of Carlow. There is also a handsome stone bridge of seven arches over the Slaney. The town has a neat church, hospital, barracks, some schools, and a slate quarry. Population, 1097.

Wexford, the capital of the county, a municipal and parliamentary borough, in 52° 20′ N. lat., 6° 28′ W. long., 73 miles S. from Dublin by railway, is situated on the S. side of the river Slaney, at its entrance into Wexford Harbour, which is large, but of very irregular form. The entrance is between the extremities of two long, narrow, sandy peninsulas, Raven Point on the N., and Roslare Point on the S., where it is less than a mile wide; but almost immediately it expands to a width of more than 8 miles. The town of Wexford lies about 4 miles from the entrance of the harbour, which contracts so suddenly opposite to it, as to be crossed by a bridge 733 feet long, a part of the roadway being made movable, to allow the passage of masted vessels into the inner portion of the bay, which again extends, though only for a short distance, to the width of about 2 miles. A bank of shifting sand outside the entrance has been increasing for some years, and it leaves so little depth of water as to render the passage inconvenient, except for small vessels. Great efforts have been made with a view to the removal of this impediment, but they have been attended with only partial success. Spacious quays extend along the harbour the whole length of the town, and there is a dockyard and patent slip. Outside of the borough is a granite column, in memory of the exploits in Egypt of the army under Abercrombie. Wexford is inclosed towards the land by a wall, which was repaired in 1804, at the expense of the corporation. The town is generally well built; but the streets are narrow. It contains two churches, three Roman Catholic chapels, a friary, two nunneries, Presbyterian, Methodist, and Friends' meeting-houses, several banks, a chamber of commerce, a Roman Catholic college, schools, county court-house, prison, infirmary, and fever hospital, town-hall, union workhouse, a barrack, and theatre. The manufacture of malt is carried on, and the herring, oyster, and salmon fisheries employ many persons. There are a distillery, three breweries, and two steam corn mills. The principal trade is by steamers with Liverpool: the exports consisting of agricultural produce, and the imports chiefly of timber. The number of vessels registered as belonging to the port in 1867 was 99 (10,500 tons). The entries in 1866 were 728 (81,878 tons), and the clearances 429 (47,455 tons). The customs revenue in 1867 amounted to 7842*l*. The municipal borough (which is co-extensive with the parliamentary one), is divided into three wards, and governed by a mayor, six aldermen, and eighteen councillors. The parliamentary borough returns one member. Population, 11,673; registered electors in 1866, 307. The town is very ancient, it having been fortified and occupied by the Danes. From the earliest period of the invasion by the English, it was one of their strongholds. In 1798 the insurgents committed great atrocities in it; amongst other things, drowning many English and Irish Protestant prisoners by throwing them over the bridge.

History and Antiquities.—According to Ptolemæus the greater part of the present county was inhabited by the Menapii, whose chief town, Menapia, is supposed to have occupied the site of the present modern Wexford. In the barony of Forth, in the S.E. of the county, many Welsh colonists, who had been driven from their own country by the early Anglo-Norman invaders, formed a settlement, and for several centuries their descendants retained the use of their own language (indeed, some of the older inhabitants still understand it), and the people are yet distinct in many respects from the rest of the population. They are, as a class, very peaceable, industrious, provident, and cleanly; and their land is well cultivated. Wexford was formed into a county by King John in 1210. In 1649 the whole district was reduced to subjection by Cromwell, who put the garrison of the capital to the sword.

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WHALES, *Cetacea*, an order of aquatic mammals with fin-like anterior extremities, the posterior extremities being absent, or rather having their place supplied by a large horizontal caudal fin or tail; without an external ear, without hair on their external integument, and the cervical bones so compressed as to leave the animal without any outward appearance of a neck. This order comprises the largest animated forms in existence.

Cuvier divides the *Cetacea* into two families, viz., the *Herbivorous Cetacea* and the *Ordinary Cetacea*. The former family includes the Lamantins or Manatees (*Manatus*, Cuv.), the Dugongs (*Halicore*, Ill.), and the Stellères (*Rytina*, Ill.). The second family includes the Dolphins, Porpoises, Narwhals, Cachalots, Whalebone Whales, and Rorquals.

With respect to the Herbivorous Cetacea, they are now, by the consent of all zoologists, placed under the order *Pachydermata*, of which, as their anatomy demonstrates, they form the aquatic section. They constitute the *Aquatic Gravigrades* of M. de Blainville. In these the teeth are of different kinds. The molars have flattened crowns, corresponding to the vegetable nature of their food. The mammæ are two, and pectoral. The lips are provided with stiff bristles. The external nostrils are always two, situated at the extremity or upper part of the muzzle, which is obtuse.

In the *True Whales* the teeth are of one kind, or wanting; and where present not adapted for mastication. The mammæ are two, pudendal. The external nostrils are double or single, and situated on the top of the head.

The true Cetacea are endowed with the power of ejecting water forcibly from the nostril or nostrils, situated on the top of the head, and for this purpose a peculiar organization is necessary. When the cetacean has taken into its mouth water which it wishes to eject, shutting its pharynx, it forces the water to ascend into the nasal passages, where certain annular fibres accelerate its progress till it raises a valve and distends two large membranous pouches above. The water, when once in the pouches, can be there retained till the animal wishes to spout. The cetacean then closes the valve, and by so doing prevents the descent of the water into the nasal passages, and forcibly compresses the pouches by means of the muscular expansion which overspreads them. The water, compelled then to escape by a narrow semilunar aperture above, is projected to a height which corresponds to the amount of the pressure applied. In the Dolphins the spout-hole is single; but in the Whalebone Whales it is double.

Reverting to the *Aquatic Pachyderms*, we may briefly notice the genera in succession.

Manatee, or *Lamantin*. Body oblong; molar teeth marked with two transversal elevations on their crown: vestiges of nails on the edges of their anterior extremities or pectoral fins: pectoral mammæ; skin very thick and naked; whiskers very strong and close set; horizontal tail thick, tegumentary, and elongated oval.

$$\text{Incisors, } \frac{2}{0}\text{; molars, } \frac{8-8}{8-8} = 34.$$

The mammæ of the Manatees and Dugongs are pectoral; and this conformation, joined to the adroit use of their flippers (whose five fingers can be easily distinguished through the investing membranes, four of them being terminated by nails) in progression, nursing their young, &c., have caused them, when seen at a distance with the anterior part of their body out of the water, to be taken for some creature approaching to human shape. One species is peculiar to the seas and mouths of rivers in the warmer regions of America. Another species inhabits similar localities on the coast of Western Africa.

The *American Manatee* (*M. Americanus*) reaches 20 feet in length, and is the *Vache Marine* of the French, and *Sea-cow* of the English.

The Manatees are gregarious, and generally go in troops. The young are usually placed in the centre of the herd for protection, and on the approach of danger, all unite for the common safety. They are so strongly attached to their offspring, that if the young Manatee be taken the captors are sure of the mother, from the recklessness with which her maternal affection leads her to the place of capture. If the mother be captured, the young follow her to the shore and fall an easy prey.

The shallow bays of the Antilles and the quiet creeks of the South American rivers, particularly in Guiana and the Brazils, are the favourite haunts of the Manatee. They were formerly abundant at the mouths of the Orinoco and Amazon, ascending many miles, even into their tributaries and the fresh-water lakes. Their food is entirely vegetable, consisting principally of subaqueous plants and littoral herbs.

The mild inoffensive manners, and the unsuspecting nature of the animal, make it an easy prey to the hunter. It is pursued for the sake of the flesh, which all pronounce to be excellent both fresh and salted. Some authorities compare it to well-fatted pork of pleasant flavour; others, when roasted, to beef or veal, and state that if salted it makes excellent sea provision.

Halicore. Body elongated, tail fin in form of a crescent, molars each composed of two cones united by the side, small-pointed tusks inserted in the incisive bones, skin very thick and without hairs. Two species are known—one (*H. dugong*) being a native of the seas of Sumatra and the Indian Archipelago; the other (*H. tabernaculi*) inhabiting the Red Sea.

In habits and manners these animals closely resemble the Manatee. They are gregarious, often appearing in the shallow water, assembled in flocks of upwards of 100 together. Their flesh is delicate and highly prized. Length from 8 to 10 or 12 feet.

Rytina (*Stellerus*, Cuvier). A single molar tooth on each side, with a flat crown traversed by bands of enamel. Flippers destitute of nails. One species only is known, the *Maskaia* (*Rytina stelleri*), from the northern latitudes of the Pacific Ocean.

We now turn to the true *Cetacea*, the Grampuses and Whales.

Family, *Delphinidæ*.

Phocæna. Muzzle short, convex, and not terminated in a rostrum. Teeth numerous, placed irregularly in each jaw. A dorsal fin.

$$\text{Molars, } \frac{40 \text{ to } 46}{40 \text{ to } 46} = 80 \text{ to } 90.$$

Example.—The Porpoise or Porpesse (*Delphinus phocæna*, Linn.) Upper part of the body deep bluish or greenish black, fading on the sides into the polished silvery whiteness of the belly. The brownish flippers rise from a white ground. Length from 4 to 5 feet. It inhabits the Atlantic Ocean and the seas of Europe.

This appears to be the φώκαινα (*phocæna*) of Aristotle ('Hist. An.' vi. 12). It is the *Porco Pesce* of the Italians (whence probably the English name *Porpesse*); *Marsouin* of the French; and *Meerschwein* of the Germans.

Porpoises swim in shoals, and drive the mackerel, herrings, and salmon before them, pursuing them up

the bays 'with the same eagerness,' says Pennant, 'as a pack of dogs does a hare. In some places they almost darken the sea as they rise above water to take breath; they not only seek for their prey near the surface, but often descend to the bottom in search of sand-eels and sea-worms, which they root out of the sand with their noses in the same manner as the hogs do in the field for their food.' In fine weather they leap, roll, and tumble in the manner so well known, principally in the spring and summer, which is supposed to be their rutting season. They go up the rivers in pursuit of the salmon (to which they are a deadly enemy), and other fish; and have been seen high in the Loire, Charente, and Seine, in France, as well as in the lochs and creeks on the Scottish coast.

The oil produced from the fat surrounding the body is very pure. The skin, when properly tanned and dressed, is used for wearing apparel and for coverings for carriages.

Delphinopterus. Head obtuse. Muzzle short and conical, or terminated in an elongated rostrum. Number of teeth variable. No dorsal fin.

Example.—The *Beluga*, or White Whale; the White Fish of the whalers (*Delphinopterus leucas*). Length from 12 to 18 feet. Locality, Northern Ocean. Gregarious in herds of forty to fifty. The *Beluga* feeds on cod, haddock, flounders, &c.

Monodon. Body elongated; a slight longitudinal projection or crest in place of the dorsal fin.

$$\text{Canines, } \frac{1-1}{0-0}; \text{ molars, } 0.$$

Example. — The *Narwhal* (*Monodon monoceros*). Locality, the Northern Ocean. This is the *Narwal* of the Germans; *Narval*, *Unicorne*, and *Licorne de Mer*, of the French. *Unicorn Whale* of the English.

Although the Narwhal has in reality two projecting tusks, one only, having a spiral twist, is generally developed, the other remaining concealed within the socket. This, however, is not always the case. The mouth is small, destitute of molars, and surrounded by stiff lips. The length is 15 or 16 feet, exclusive of the tusk.

Narwhals swim with great swiftness. When at the surface for respiration, they blow repeatedly with considerable force, and then frequently lie motionless for several minutes with their back and head just above water. Dr. Scoresby describes them as often sporting about his ship, sometimes in bands of fifteen or twenty together, often elevating their long tusks, and crossing them with each other as if they were fencing. The blubber yields a very superior oil, which, as well as the flesh, is considered a dainty by the Greenlander, who kills the fish with harpoons, &c., in the fissures of the ice, where it comes up to respire. The ivory of the tusk is considered superior to that of the elephant: it is very dense and hard, very white, is not subject to become yellow, and is susceptible of a high polish.

Family, *Physteridæ*.

Physter.—Length of the head equal to a third or half the total length. Upper jaw large, elevated, and either without teeth or furnished with very few, which are short, and nearly entirely hidden by the gum; lower jaw narrow, and armed with stout conical teeth. Orifices of the blow-holes united, and situated at the end of the upper part of the muzzle. No dorsal fin.

Example.—The *Cachalot* or *Sperm-Whale* (*Physter macrocephalus*.)

The range of the Cachalot is very extensive. The species has been seen in almost all seas; but it is principally found in the Southern Ocean, on the coast of America, Japan, New Guinea, Timor, &c. The head of the Cachalot presents a very thick blunt extremity. Its junction with the body is a large protuberance or hump on the back called 'the bunch of the neck:' immediately behind this is the thickest part of the body, which from thence gradually tapers off to the tail, where there is another large prominence called 'the hump,' from which a series of smaller processes run half way down the back or tail. The body then contracts so much as to be at last finally not thicker than that of a man, and terminates by expanding on the sides into the 'flukes,' which form a large triangular horizontal fin, about 6 or 8 feet in length, and from 12 to 14 in breadth, in the largest males. The slit of the single blowing-hole or nostril is about 12 inches in length. In the right side of the nose is the 'case,' a cavity for the purpose of secretion and containing an oily fluid, which after death concretes into a granulated yellowish substance: this is *Spermaceti*. Beneath the case and nostril is the mass of 'junk,' formed of dense cellular tissue strengthened by strong tendinous fibres, and infiltrated with very fine sperm oil and spermaceti. The mouth extends near the whole length of the head. Both jaws are furnished with tolerably well-developed lips. The tongue is soft and white. The throat is capacious enough to give passage to the body of a man, presenting a strong contrast to the contracted gullet of the Greenland whale. The eyes are small in proportion to the size of the animal, and furnished with eyelids. Not far from the posterior angle of the mouth are the swimming paws or fins, not much used in progression, but probably more as balances, and occasionally in supporting the young. A sperm whale of the largest size is about 80 feet in length. The skin is smooth, but occasionally in old whales wrinkled. The general colour is very dark, deepest on the upper part of the head, back and flukes, in which situation it is sometimes black: on the sides it gradually assumes a lighter tint, and on the breast becomes silvery gray. Immediately beneath the black skin is the blubber or fat, of a light yellow colour, producing the sperm oil when melted.

As the bulk of the head consists of a membranous case containing thin oil, it is specifically lighter than any other part of the body, and a slight effort will suffice to raise the whole flat surface of the nose out of the water. Respiration is effected at very regular intervals, when the snout emerges, and from the extremity of the nose the spout is thrown up. It is formed of the expired air forcibly ejected through the blow-hole, and acquires a white colour from the particles of water previously lodged in the cavity or fissure of the nostril, and also from the condensation of the aqueous vapour thrown off by the lungs. The spout is projected at an angle of 136° in a slow and continued manner for about three minutes, and may be seen from the mast-head in favourable weather at the distance of 4 or 5 miles. Immediately after each spout the head sinks beneath the water, scarcely a second intervening for the act of inspiration, the air rushing into the lungs with great velocity. There is, however, no sound caused by inspiration, and very little by expiration in this species. Ten seconds is occupied by a large sperm whale in making one inspiration and one expiration. At each breathing time the whale makes from sixty to seventy expirations, and remains at the surface from ten to eleven minutes. When the breathing time is over, the head sinks slowly, the 'small,' or the part between

'hump' and 'flukes,' appears above the water curved; the flukes are lifted high into the air, and the animal having assumed a straight position, descends perpendicularly to an unknown depth. It continues thus hidden beneath the surface for about an hour and ten minutes.

Small fishes are occasionally swallowed in quantities by this whale; but its principal food appears to consist of cuttle-fishes. [SEPIADÆ.]

The species is gregarious; and the herds are of two kinds, one consisting of females, the other of young males not fully grown.

Family, *Balænidæ*.

In the members of this family the head is not so convex as that of the Cachalot. Both sides of the upper jaw within the mouth are furnished with transverse plates of a fibrous horny substance, which is the *baleen* or *whalebone*. The lower jaw is entirely unarmed.

Balæna. No dorsal fin; but in some species there is a dorsal boss, or hump.

Example.—The *Mysticete* or Greenland Whale (*Balæna mysticetus*).

Cuvier observes that in the genus *Balæna* 'the upper jaw, in the form of a boat's keel reversed, has its two sides furnished with transverse, thin, and closely set laminæ, termed baleen plates, formed of a sort of fibrous horn, with unravelled or filamentous edges, that serve to retain the small animals on which these enormous cetaceans subsist. Their lower jaw, sustained by two osseous branches, arched outwards and upwards, without any teeth, lodges a fleshy tongue, very thick; and envelopes, when the mouth is closed, all the internal part of the upper jaw, and the horny laminæ with which it is clothed.'

The common Whale, Greenland Whale, or Great Mysticete, appears to be the Μυστίκητος of Aristotle ('Hist. Anim.,' iii. 12). The habitat usually assigned to it is very extensive. Lesson states that it inhabits all the seas of the globe, especially the two poles; but it is not improbable that the Whalebone Whale, or Black Whale, of the South Seas, *Balæna Australis*, Desmoulins, has been mistaken for the Greenland. The size of this whale when full grown is from 65 to 75 feet.

This species seems to hear acutely any noise made in the water, such as splashing, &c., in calm weather; but a sound produced in the air, a loud shout for instance, when the whale is only at the distance of a ship's length, is disregarded. The usual rate of swimming seldom exceeds 4 miles an hour, but it will descend when harpooned at a velocity of 7 or 8 miles. It seldom remains at the surface to breathe longer than two minutes, during which period it blows eight or nine times.

A very considerable portion of the feeding grounds is occupied by what is termed 'green water,' which swarms with minute life, and has been carefully examined and described by Dr. Scoresby. The smallness of the gullet is only fitted for swallowing small animals, such as the *Clio borealis*. This mollusc is said to constitute the chief support of the Mysticete, and the structure and disposition of the whalebone plates explain how this or any other small species of animal is retained in its capacious mouth, while the water taken in along with them drains through the interstices of the plates. When the Mysticete feeds, it swims rapidly below the surface with open jaws; a stream of water enters them, and with it myriads of small marine animals; the water finds an outlet at the sides, but the thick internal hairy apparatus of the whalebone does not permit one of those captives to escape.

WHATELY, RICHARD, Archbishop of Dublin, a distinguished theologian, political economist, and logician, was born in Cavendish Square, London, on the 1st of February, 1787. He was the fourth son of Dr. Joseph Whately, of Nonsuch Park, near Cheam, Surrey, prebendary of Bristol, vicar of Widford, and lecturer at Gresham College. From a private school in Bristol, he was sent, in 1805, to complete his education at Oriel College, Oxford, where he became the friend and intimate companion of Arnold, Keble, Pusey, and J. H. Newman, all men who have since made their 'mark' in the church, and in the literature of their country. In 1808 he took the degree of B.A., winning a second class both in classics and mathematics. He carried off the prize for the best English essay in 1810. In the following year he was elected a fellow of his college, and in 1815 became one of its tutors. In 1821 he married a daughter of W. Pope, Esq., of Hillingdon, Middlesex.

A year or two previously he had contributed two noteworthy articles to the 'Encyclopædia Metropolitana,' which formed the groundwork of his admirable and well-known treatises on 'Logic' and on 'Rhetoric.' In 1821 he gave to the world his sermons 'On the Christian's Duty with respect to the Established Government and the Laws,' and the work which first attracted public attention, his 'Historic Doubts relative to Napoleon Bonaparte.' In this able *jeu d'esprit* he applied to the history of the great conqueror the same *à priori* mode of argument which atheists and deists had brought to bear on the scriptural chronicle of the Saviour's career. In the following year its author was presented to the vicarage of Halesworth, in Suffolk, and delivered the Bampton lectures at the university, selecting for his theme, and treating it with conspicuous ability, the 'Use and Abuse of Party Feeling in Religion.'

In 1825 he was appointed principal of St. Alban's Hall, which a long course of lax discipline had reduced to a sadly disorganized condition. His vigorous management and the influence of his energetic character soon retrieved its reputation. In the same year he published his valuable 'Essays on some of the Peculiarities of the Christian Religion,' in which his liberal sympathies and breadth of thought were sustained by searching criticism and close reasoning. His 'Elements of Logic' appeared in 1826; his 'Elements of Rhetoric' in 1828. Both these works are now recognized and popular text-books. His mental activity was prodigious; and in 1828 he also issued his cogent 'Essays on some of the Difficulties in St. Paul's Writings.' In 1829 he was nominated professor of political economy; but after delivering an inaugural course of lectures, he was promoted by Earl Grey, in 1831, to the archbishopric of Dublin; a high dignity which he held, through good and evil report, with moderation, calmness, and scrupulous integrity, while discharging its duties with the vigour and good sense so characteristic of the man.

The heavy official labours of his position did not check his industrious pen. In 1830 he published his 'Thoughts on the Sabbath,' their liberality of tone provoking the censure of the bigoted party in the church; and his 'Errors of Romanism traced to their Origin in Human Nature.' His 'Introductory Lectures on Political Economy' appeared in 1831. He gave his earnest and unflinching support to the national system of education introduced into Ireland by the Liberal government, and acted as the leading spirit of the Educational Board until 1853, when he resigned, on the ground that the majority were diverging from the principles on which it had originally been constituted. Meanwhile, he was ever

active in the promotion of any well-considered scheme for the improvement of the condition of Ireland; and his charity was as wide as it was judicious and unostentatious. In private life he appeared to great advantage. His hospitality was unbounded. His conversation was singularly felicitous, sparkling with apt illustrations and epigrammatic sayings. He showed no great regard, it is true, for conventional proprieties; but he was a firm friend, and the young found in him a sympathizing, generous, and shrewd adviser. The great characteristic of his mind was its logical good sense. He had a wonderful power of brushing aside cobwebs and clearing away obstructions, so as to render the whole course of an argument, however obscure and apparently involved, clear to the dullest reader. His intellect was of a practical and analytical cast; he traced means to their ends, results to their primary causes; it was a lucid, penetrating intellect, but deficient in comprehensiveness. What he saw, he saw with marvellous distinctness, and had a happy faculty of making visible to others, but he did not see all. There was no poetical side to his character; a great deficiency, for without poetry a man can never be of the highest order of genius; and it is in this respect he was so far inferior to his great model, Bacon.

Whately died the death of a Christian, October 8, 1863. Besides the works already mentioned, he published, during his lifetime, his 'Kingdom of Christ Delineated,' the ablest and most valuable of his writings; 'English Synonyms,' full of shrewd remark and happy illustration; an admirably annotated edition of Lord Bacon's 'Essays;' his 'Introductory Lectures on the Study of St. Paul's Epistles;' and numerous charges and controversial pamphlets. Since his death, his daughter, Miss E. J. Whately, author of 'Rugged Life in Egypt,' has given to the world 'Miscellaneous Remains from the Commonplace Book of Richard Whately, D.D.' (London, 1864), which contain some of his most felicitous thoughts on a vast variety of subjects, set in a framework of choice and lucid language. To this lady we are also indebted for the 'Life and Correspondence of Archbishop Whately' (London, 2 vols., 1866), which is principally to be read for the sake of the extracts it contains from the archiepiscopal letters, throwing a vivid light on the character of this great and good man, whose place among us will not be readily filled up.

WHEAT (*i.e.*, 'the white plant;' Gothic, *hvaiteis*, Ang.-Sax. *hvæte*). The species and varieties of Wheat are mentioned in the article TRITICUM. There are, however, three principal kinds, so different in appearance that they claim peculiar attention. These are the hard, the soft, and the Polish Wheats. The hard are the produce of warm climates, such as Italy, Sicily, and Barbary. The soft grow in the northern parts of Europe, as in Belgium, England, Denmark, and Sweden. The Polish grow in the country from which they derive their name, and are also hard wheats. It is from their external form that they are distinguished from other varieties. The hard wheats have a compact seed nearly transparent, which, when bitten through, breaks short, and shows a very white flour within. The soft are those usually cultivated in Britain; they have an opaque coat or skin, which, when first reaped, gives way readily to the pressure of the finger and thumb. These require to be well dried and hardened before they can be conveniently ground into flour. The Polish wheat has a long chaff which is much longer than the seed, a large oblong hard seed, and an ear cylindrical in appearance. It is a delicate spring wheat, and not very productive in the climate of England.

The hard contain much more gluten than the soft wheats. It is this which causes the Italian kinds to be used exclusively for the pastes which form so large a proportion of the food of that nation. [VERMICELLI.]

The distinction between the winter and summer wheats is one which arises entirely from the season in which they have been usually sown; for they can readily be converted into each other, by sowing earlier or later, and gradually accelerating or retarding their growths. The difference in colour between red and white wheats is owing chiefly to the soil; white become darker and ultimately red in some stiff wet soils, and the red lose their colour and become first yellow and then white on rich, light, and mellow soils.

The soil which is best adapted to the growth of wheat is a deep loam inclined to clay, with a dry subsoil. If this is not so naturally, it must be drained artificially, to insure good crops. Wheat requires a soil in which the organic matter is intimately mixed with the earthy ingredients; where it can have a firm hold by its roots, and can at the same time strike the fibres of them downwards as well as around, in search of food. When it meets with such a soil and is deposited at a proper depth, it vegetates slowly, pushing to the surface one cylindrical filament, while numerous fibres strike into the soil from the seed. These supply the plant with regular nourishment, and in due time a knot is formed at the surface of the soil, from which several roots and stems branch out. This is called the *tillering* of the wheat. The new roots near the surface soon become the chief source of nourishment, and in a rich compact soil, where there is room, numerous stems arise, forming a tuft, and each of these in time bears a large ear well filled with seeds.

The repeal of the protective duties on wheat is mentioned in the article CORN-LAWS.

The quantity of wheat produced in the United Kingdom is never sufficient for the home consumption, even in the years of the most favourable harvests. The following table gives the imports for 1866, which was a fair average year, and shows the countries from which the supplies are chiefly derived:—

Countries.	Total Imported.	Value.	Average Price fixed for the Value.
	Cwts.	£	Per Cwt. s. d.
From Russia,	8,937,199	4,823,361	10 9½
" Denmark,	506,236	275,485	10 10½
" Prussia,	4,401,409	2,810,851	12 9½
" Schleswig, Holstein, and Lauenburg,	187,938	101,452	10 9½
" Mecklenburg-Schwerin,	733,571	452,810	12 4
" Hamburg,	816,215	467,342	11 5½
" Bremen,	62,697	34,993	11 1½
" Belgium,	261,838	136,335	10 5
" France,	3,473,130	1,789,428	10 3
" Spain,	572,035	338,724	11 9½
" Italy: Venetia,	115,491	59,132	10 3½
" Austrian Territories,	1,326,529	676,915	10 2½
" Turkey Proper,	387,252	199,104	10 3½
" Wallachia & Moldavia,	141,181	73,151	10 4½
" United States:—North Atlantic Ports,	450,267	250,540	11 1½
" United States:—Ports on the Pacific,	184,972	124,488	13 5
" Chili,	308,810	211,827	13 8½
" Other parts,	289,559	157,184	10 10½
	23,156,329	12,983,000	

The customs duty on wheat imported into the United Kingdom is 3*d.* per cwt., and the amount received in 1866 was 289,340*l.* In the same year there were exported 230,894 cwts. of British wheat, value 140,077*l.*, and 46,813 cwts. of foreign, value 26,332*l.* Four-fifths of the whole quantity were sent to France.

WHEATEAR, one of the English names for the *Saxicola œnanthe* of authors, *Motacilla œnanthe*, Linn., genus *Vitiflora* of Belon and Brisson. This is the *Motteux* and *Cul-Blanc* of the French; *Codo-Bianco* and *Culo-Bianco* of the Italians; *Steinschwatzer* and *Weisschwanz* of the Germans; *Fallow-chat*, *White-tail*, and *Wheatear* of the British.

Geographical Distribution.—Very wide. Lapland, Denmark, Sweden and Norway, Iceland, and Faroe Islands. In Europe it is abundant, particularly on the northern shores of the Mediterranean. In these islands the Wheatear arrives about the middle of March, and the great body have left us about the end of September. They visit the Hebrides, Orkneys, and Shetland.

Habits, Food, &c.—Insects generally, which are captured on the wing, coleoptera and their larvæ, and worms, form the food of the Wheatear, which generally sits on the watch upon an elevated clod or stone.

The nest is framed of dried roots and feathers, rabbit's down, &c.; and the eggs, generally six in number, are pale blue. The bird manifests sometimes great precaution in selecting a place for it not easily to be detected. Old walls, gravel or chalk pits, are frequently the localities.

When the Wheatears begin to draw towards our southern counties previous to their departure, they soon fall victims to the eagerness with which they are sought as delicacies for the table. The shepherds and others form traps for them in the downs by cutting out pieces of turf, which are so placed as to leave a passage beneath, and in this horse-hair nooses are set. The birds, when alarmed, run in, and are caught.

Besides the Wheatear here noticed, Mr. Gould describes and figures the following as European:—The Black Wheatear (*Saxicola cachinnans*, Temm.); the Pied Wheatear (*Saxicola leucomela*, Temm.); the Russet Wheatear (*Saxicola stapazina*, Temm.); and the Black-eared Wheatear (*Saxicola aurita*, Temm.).

WHEELING. [Virginia, West.]

WHERRY, a boat much employed in river navigation, which has its bow and stern nearly alike, and both shaped at a very large angle with the keel. It is a very light craft, built for swiftness, and can be rowed by a pair of sculls.

WHETSTONE, a talcose slate containing silica, much used for the manufacture of hones.

WHEWELL, WILLIAM, D.D., was the son of a joiner, and born at Lancaster in 1795. He was intended to be bred to his father's trade, but displaying, while at school, extraordinary mathematical talents, his friends made arrangements which enabled him to complete his education at the University of Cambridge.

He entered Trinity College, and soon acquired distinction by his remarkable natural powers and great capacity for work. His career was extremely brilliant. In 1816, when only twenty-one years of age, he took his degree as B.A., and came out in the examination lists as second wrangler, and second Smith's prizeman. In the following year he was elected a fellow of Trinity, and soon afterwards was appointed to a tutorship, which he retained for a considerable period with great success. In 1820 he became a fellow of the Royal Society.

His industry, like his learning, was prodigious; and being endowed by nature with a robust constitution, he was capable of an amount of labour under which most men would have prematurely sunk. While attending to a host of pupils, he produced year after year a succession of text-books on mathematical and scientific subjects, of essays, reviews, and miscellaneous papers, which ranged over the wide world of literature and science, from a discussion of the theory of tides to a criticism of the last German romance. Few men in England have approached more nearly to the old type of the *helluo librorum*, or 'book-devourer:' he read everything, and he knew everything; and was always ready with novel and sound information on any topic, even, as a story long current jestingly asserts, on Chinese music! It is certain that his erudition was no less comprehensive than profound, and neither Parr, Bentley, nor Porson, though there were giants in those days, could have approached Whewell in variety and solidity of learning.

In 1828 he was appointed professor of mineralogy at Cambridge, and while holding this important chair produced the work which first secured him an European reputation, 'Astronomy and General Physics considered in Reference to Natural Theology' (published in 1833), forming not the least remarkable treatise in the Bridgewater series. He quitted the mineralogical chair in 1832, and devoted his 'learned leisure' to the preparation of his great work on the 'History of the Inductive Sciences, from the Earliest to the Present Times' (London, 1837). In 1838 he accepted the professorship of moral theology, which he held, with ever-increasing reputation, until 1855, in which year he was appointed vice-chancellor of the university. His 'Lectures on the History of Moral Philosophy in England' attracted considerable attention, and his fame was largely augmented by his publication, in 1840, of his closely-reasoned 'Philosophy of the Inductive Sciences, founded upon their History.'

Whewell, however, as the reader will infer from the preceding remarks, was not a discoverer or an original investigator. His genius lacked boldness, force, and the *vivida vis* of a strong imagination. His superstructures were built up on the labours of previous inquirers, but he displayed a remarkable talent in gathering the results of those labours, and he knew how to avail himself of them to the highest advantage. One of his most original works is his 'Elements of Morality;' one of his most popular, 'The Plurality of Worlds.' His style is always clear and vigorous, and his immense learning renders his illustrations as numerous as they are appropriate. To enumerate all his writings would be impossible in our limited space, and to those already mentioned it must suffice for us to add 'The History of Scientific Ideas,' 'Indications of the Creator,' a 'Translation of the Works of Plato,' and 'The Platonic Dialogues for English Readers.'

Whewell's life was singularly free from severe trials. He was surrounded by a large circle of friends and admirers; ruled in his university with almost despotic authority; enjoyed an extended and well-deserved reputation; and was never checked in his beloved studies by any of those ills which human flesh is generally heir to. He might probably have attained a ripe old age, but a severe fall from his horse while out riding brought on concussion of the brain, and the injuries he had received proved fatal after a few days' illness. He died at his rooms in Trinity College, in 1866, aged seventy-one.

WHEY (Anglo-Sax. *hwäg*), the limpid part of milk left after the separation of the acid and butter, and containing between 3 and 4 per cent. of sugar of milk in solution.

WHIG. Different accounts are given of the origin of

this word. The most probable, as given by Bishop Burnet, refers it to the Scotch covenanters, called *Whiggamores;* though Defoe says it was derived from a mixed drink of sour milk and water which they drank during their wanderings. It was adopted as a distinctive party name by the politicians who placed William III. on the English throne, and is still in vogue, though to some extent superseded by the modern term 'Liberals.'

WHINCHAT, *Saxicola rubetra*, Auct., *Motacilla rubetra*, Linn. This is the *Traquet* of the French; *Grosser Fliegenfanger* of the Germans; and *Stiaccino* of the Italians.

Geographical Distribution.—Norway, Sweden, temperate Russia, but not Siberia; all southern Europe to the Mediterranean shore. In the British Islands they are generally but not numerously diffused in the summer. They arrive here about the middle of April, and depart in autumn.

Habits, Food, &c.—The flight of the Whinchat is undulating, and it flits from bush to bush, perching on one of the topmost twigs. Furze commons are its favourite haunts. Worms, insects, small shell-molluscs, and slugs, form its principal food, but it also eats berries. The nest resembles that of the stonechat, and is formed of dry grass stalks and a little moss, the lining being finer bents or stalks. It is usually placed on the ground. The eggs are five or six in number. There are generally two broods, the first appearing towards the end of May. The song is very pleasing, and somewhat resembles that of the goldfinch. Whinchats become, like the Wheatear, very fat in August, and, though smaller, are equally delicate for the table.

WHINSTONE, a species of basaltic rock, greenstone, or trap, forming hard dykes which penetrate other rocks. In Scotland the name is popularly given to almost any kind of hard compact stone. It probably comes from the same root as *whine*, and the whine or whin stone would refer to a stone which, when struck, gives forth a sharp, ringing sound.

WHIPPER-IN, in Parliament, one who enforces party discipline among the supporters of the ministry, and urges their attendance on all questions of importance to the government. He generally holds the office of patronage secretary to the Treasury.

WHIP-POOR-WILL, *Caprimulgus vociferus* of authors. The *Whip-poor-will* is an American species of the *Caprimulgidæ*. It is of the size of a thrush.

Nuttall says that this species arrives in the middle states about the close of April or beginning of May, proceeding in its vernal migration along the Atlantic countries to the centre of Massachusetts. Sir J. Richardson states that he observed this bird on the northern shores of Lake Huron only, the fiftieth parallel being probably the limit of its range. It arrives in Pennsylvania about the middle of April. The elevated dry barren lands of Kentucky are its favourite resorts, and it is very seldom heard in low marshy tracts of country.

Habits, Food, &c.—*Phalænæ* and other large nocturnal insects, beetles, grasshoppers, ants, &c., form the food of this night-jar. It lays two eggs, which are deposited about the second week in May in the middle states, but considerably later in Massachusetts. There can hardly be said to be any nest, but the female selects some secluded spot in the forest.

An eminent naturalist remarks that, in the lower part of the state of Delaware, he found these birds troublesomely abundant in the breeding season, so that the reiterated echoes of *whip-whip-poor-will, whip-peri-will*, issuing from several birds at the same time, occasioned such a confused vociferation, as, at first, to banish sleep. This call, he adds, is continued, except on moonlight nights, usually till midnight, when they cease until again aroused, for a while, at the commencement of the morning twilight. They pass the day in repose, retiring to the deepest and darkest woods.

Chuck-will's-widow, Caprimulgus Carolinensis, the *Carolina Goatsucker*, is another species, which is seldom seen to the north of Virginia, but in the interior up the banks of the Mississippi as far as the thirty-eighth degree. It arrives in Georgia and Louisiana about the middle of March, and in Virginia early in April. It retires from the United States probably to winter in some part of the tropical continent, about the middle of August.

Habits, Food, &c.—Flying low, and skimming a few feet above the surface of the ground, it settles on logs and fences, from which it pursues the flying moths and insects on which it feeds; sometimes sailing near the earth, it alights to pick up a beetle, or flutters round the trunk of a tree in search of any insect that may be crawling on the bark. It commences its serenade of *chuck-will's-widow* soon after sunset, continuing the cry with short interruptions for several hours, and renewing it towards morning till the opening dawn. The tones are slower, louder, and more full than those of the *Whip-poor-will*.

WHIRLPOOL. [MAELSTROM; SCYLLA AND CHARYBDIS.]

WHISKY, from the Gaelic *uisge*, 'water,' *usquebaugh*, 'water of life,' is properly made from malted barley, but by distillation it may be obtained from almost any variety of grain, as well as from potatoes, and even from turnips. In America it is often made from rye, and inferior qualities from oats, rice, mullet, buckwheat, &c. Scotland, Ireland, and the United States of America are almost the only whisky-producing countries, the best being made north of the Tweed. The manufacture is very similar to that of other spirits, described in the article DISTILLATION. Whisky, and in fact all spirits, being regarded more as luxuries than otherwise, they are subject to very high duties; and as the higher the duty the greater the temptation to smuggling and evasion, distilleries are subject to most stringent oversight by the officers of excise, who exercise a supervision on the premises day and night, Sunday and week-day, and who are vested with an authority in many respects superior even to that of the proprietor himself. Apart from their being articles of luxury, the legislature has another idea in imposing a heavy tax upon spirits, namely, that of checking the consumption, as the most pernicious effects arise from their excessive use. It was with this avowed object that, early in the last century, the government laid the enormous duty of 20*s.* per gallon on these spirits, besides heavily taxing the retail dealers. The expedient, however, failed, for the trade then became unprofitable, and fell into the hands of the most unscrupulous and even criminal classes, who began smuggling on the largest scale; to such an extent, indeed, and with such violence, that the revenue officers found it impossible to prevent it, and the Act having thus become a dead letter, it was repealed in 1742, and a lower duty substituted. In Ireland the repressive system was still continued, but its total failure was seen in the fact that in one year when the consumption was 10,000,000 gallons, duty was paid on 3,000,000 only. Illicit distillation abounded, the most daring assaults were made upon the excisemen, whose lives became unsafe; and as the common people invariably sided with the smugglers, the country became almost in a state of

rebellion. This led to the adoption, in 1823, of a much lower duty in Ireland and Scotland than in England, which difference existed (though the amount varied) till 1858, when the duty was equalized throughout the United Kingdom, being then made an uniform rate of 8*s.* per gallon. In 1860 it was raised to 10*s.* by Mr. Gladstone, whose chief object was to diminish the consumption, which, however, does not seem to have been attained. Owing, perhaps, to the improved morals of society, as well as to the vigilance of the officers, illicit distillation and smuggling are declining; but the high duty seems to have increased the temptation to produce a greatly adulterated and very injurious article, which may be sold at a cheaper rate than the market price of the genuine spirit will allow. Much of the Scotch and Irish whisky is purchased by English rectifiers for conversion into British gin; it is also to some extent sent to France, to be returned as brandy.

Whisky is not described under that name in the official returns—it being kept there under the heading of 'British Plain Spirits.' As, however, scarcely any spirits but whisky are made either in Scotland or Ireland, the following statistics for the years 1865-67 may be fairly taken as furnishing the most important particulars with regard to the whisky trade of the United Kingdom:—

	Charged with Duty, and Free of Duty.			Exported to Foreign Countries on Drawback, and Free of Duty.			Retained for Home Consumption.		
	1865.	1866.	1867.	1865.	1866.	1867.	1865.	1866.	1867.
SCOTLAND.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Charged with duty, . . .	7,378,931	7,691,760	7,329,320	498,443	411,084	391,775			
Free of duty for exportation,	2,510,219	232,456	552,188	2,510,219	232,456	552,188	6,880,488	7,280,676	6,937,545
Total, ...	9,889,150	7,924,216	7,881,508	3,008,662	643,540	943,963			
IRELAND.									
Charged with duty, . . .	5,258,232	5,910,061	6,404,357	159	4,499	592,183			
Free of duty for exportation,	612,139	2,832	71,055	612,139	2,832	71,055	5,258,073	5,905,562	5,812,174
Total, ...	5,870,371	5,912,893	6,475,412	612,298	7,331	663,238			

The manufacture of whisky similar in process to that pursued in the United Kingdom, is largely carried on in New York, Pennsylvania, Ohio, Illinois, Indiana, Kentucky, and other parts of the United States of North America. The value of the quantity annually consumed in that country alone is nearly 6,000,000*l.*

WHITBY. [YORKSHIRE.]

WHITCHURCH. [HAMPSHIRE; SHROPSHIRE.]

WHITE LEAD is the basic carbonate of lead, and largely employed in the making up of white oil paint, and to a smaller extent in the manufacture of cements. It is prepared either by precipitation, carbonic acid being used to decompose a soluble salt, or a basic salt of lead; or by exposing plates of cast lead to the joint action of the vapour of acetic acid, air, and carbonic acid. The latter process is the more effective, and it is only in this way that the white lead acquires a proper degree of density and opacity. It is called the Dutch process, and, according to Brande, was introduced into England about 1780. White lead is frequently adulterated with sulphate of baryta; but as the latter is insoluble in dilute nitric acid, while pure white lead entirely dissolves, its presence is readily detected. From 18,000 to 21,000 tons are annually manufactured in the United Kingdom.

WHITE SEA, a large gulf of the Arctic Ocean, which enters deeply into the northern parts of European Russia, between 64° 30′ and 68° 30′ N. lat. The entrance is between Kanin Noss, on the island of Kaninskaia Zemlia, which lies to the east, and Swatoi Noss, a projecting cape of the peninsula of Kola, on the west. These two places are about 100 miles distant from each other. The gulf penetrates into the land 350 miles in a S.E. direction, gradually becoming narrower, until part of it turns to the north-west and forms the Gulf of Kandalak, where it is hardly more than 40 miles wide. That portion which proceeds to the S. and S.E. is much broader, and expands into the two large gulfs of Archangel or the Dwina, and that of Onega, named respectively from the rivers that fall into their most south-eastern recesses. The area of this sea is said to be about 44,000 square miles, and the length of its coast line about 1000 miles. It is so far favourable to navigation, that it has a considerable depth of water, with the exception of a sandbank which lies before the mouth of the Dwina. It is frequently covered with fogs, which are thick at a distance from the shore, but much less so as the coast is approached. The navigation, however, is restricted to about six months of the year, in consequence of the ice, which is sometimes found even at a distance of 30 miles from the shore. It is at this time that the sea answers its name, as the ice is nearly always covered with a hard incrustation of snow. There are several inhabited islands in different parts. The important harbour of Archangel is near the mouth of the Dwina. Seals, herrings, and cod-fish, are very frequently met with on the shores. The white whale, which yields a valuable oil, is found in large shoals.

WHITE WOOD, a name applied to the timber of various trees, as the *Laganaria Patersoni*, *Liriodendron tulipiferum*, *Nectandra leucantha*, *Oreodaphne leucoxylon*, *Pittosporum bicolor*, *Tecoma leucoxylon*, and *Tilia Americana*.

WHITEBAIT, formerly supposed to be the young of the shad, is the *Clupea alba* of Yarrell, and is figured and described in his valuable 'History of British Fishes.'

It was first detected in Scotland by Dr. Richard Parnell, who remarks, 'I have no doubt that the whitebait will be found to exist in the Firth of Forth throughout the whole year in considerable quantity, and that the fishermen would find it a new source of income equal or superior to the sperling fishery, did they use the mode of fishing for whitebait that is practised on the Thames.' He also detected the whitebait in great quantities in the Solway Frith, in the months of June and July, where, however, the daintiness of the morsel was long unknown to the inhabitants of its shores. The principal food of this fish seems to be a species of shrimp.

About the end of March or early in April, whitebait begin to appear in the Thames. The fishing season begins in June, and continues till September. During these months immense quantities are consumed by

visitors to Greenwich, Blackwall, &c. 'At present the fashion of enjoying the excellent course of fish as served up either at Greenwich or Blackwall, is sanctioned by the highest authorities, from the court of St. James' palace in the West, to the lord mayor and his court in the East, including the cabinet ministers and the philosophers of the Royal Society.' The close of the parliamentary session is always indicated by a 'whitebait dinner,' in which all the leading members of the government participate.

WHITEHAVEN. [CUMBERLAND.]

WHITHORN. [WIGTONSHIRE.]

WHITING. Chalk cleared of all stony matter, pulverized, levigated, and made up into small cakes. It is often used as a polishing material.

WHITING, the *Merlangus vulgaris* of Cuvier, *Gadus Merlangus* of Linnæus, a valuable fish on account of its delicacy and lightness as an article of food, in which properties it surpasses all others of its tribe. It is easily distinguished from the cod, haddock, and bib, by the absence of the barbule on the chin; and from the coal-fish, pollock, and green cod, by having the under jaw shorter than the upper, a black spot at the base of the first ray of the pectorals, and the tail even at the end. It abounds on all the British coasts, and comes in large shoals towards the shore in the months of January and February, for the purpose of depositing its spawn. It feeds on mollusca, worms, crustacea, and small fishes indiscriminately, and sometimes weighs several pounds, though usually it does not exceed one pound and a half.

WHITSTABLE. [KENT.]

WHITSUNTIDE is probably a contracted form of White Sunday tide or time. In the early ages of Christianity the favourite seasons for administering the rite of baptism were Easter Sunday, the anniversary of the resurrection of Christ; and Whit-Sunday, that of the Jewish feast of Pentecost, when the apostles were 'baptized with the Holy Ghost and with fire,' and they themselves commenced their public ministry by baptizing three thousand persons. As emblematic of the spiritual purity which the rite of baptism is supposed to confer, those who received it were clothed in white, and the day is hence conjectured to have received its name of White Sunday (*Dominica alba*). Our ancestors seem to have indulged to excess at the season of Whitsuntide in all kinds of exercises and amusements, for which many of the parishes provided the needful stimulus, and out of which they claimed their due share of profit. For this purpose a house or barn, called the church-house, was set apart, and a quantity of ale was brewed, which was called Whitsun Ale, or Church Ale, and was sold to the parishioners who came there to feast, drink, and gamble; the profits being applied to the repair of the church, and sometimes to charitable or other purposes. In England, at the present day, Whitsuntide is looked forward to by many thousands as the most popular holiday-time of the year; indeed, in many towns in the north, business is almost suspended throughout the Whitsun week.

WHITTLESEA. [CAMBRIDGESHIRE.]

WHOOPING COUGH. [HOOPING COUGH.]

WHORTLEBERRY. The common name of several species of plants of the genus *Vaccinium*, and also of its fruit. [VACCINIUM.]

WIASMA. [SMOLENSK.]

WIBORG or WYBORG. [JUTLAND.]

WICK, a seaport of Scotland, royal and parliamentary borough, and the capital of the county of Caithness, situated at the mouth of the river Wick, close to Noss Head, on the North Sea, is 111 miles from Inverness, the nearest railway station, and 379 from Edinburgh. It is the principal seat of the herring fishery in Scotland, and comprises a large suburb named Pulteney-town, which lies a short distance up the creek or inlet called Wick Bay, on the opposite side of the river, and was built in 1808 by the British Fishery Company to serve as a port for the borough. A handsome stone bridge affords communication between the two places. The chief buildings in Wick are two churches, eight chapels, county and town house, banking offices, custom-house, and gaol. It has a chamber of commerce and an agricultural society; is the seat of sheriff, commissary, and small-debts courts, and the county quarter sessions are also held here. Distillation and rope-making are carried on, but the inhabitants are principally dependent on the fisheries in the neighbouring seas, in which from 1000 to 1200 boats are employed, each manned by five or six hands. The fishing season commences about the middle of July, and usually continues for eight weeks, during which period the town is the scene of great bustle and activity. Many persons arrive from the western Highlands to serve in the boats, depending chiefly upon the wages they may then earn to pay the rent of their small holdings. The fishery is liable to great fluctuations, the quantity caught in some seasons being four times as much as in others. Large numbers of the herrings, when cured, are sent to Germany, Italy, and the West Indies. The harbour of Wick is much exposed, but a breakwater, now (1868) being constructed, and which is estimated to cost 120,000*l*., will remedy this defect. Steamers run to Aberdeen and Granton, and a mail packet to Leith. The number of vessels registered as belonging to the port in 1867, was 67 (5771 tons). The entries in 1866 were 968 (82,816 tons), and the clearances 807 (79,880 tons). The customs revenue in 1867 was 757*l*. Wick is the head of a parliamentary district, including also the boroughs of Cromarty, Dingwall, Dornoch, Kirkwall, and Tain, in conjunction with which it returns one member to the House of Commons. The population of the whole district is 16,995; of Wick alone, 7475. The inhabitants within the municipal limits of the royal burgh only number 1551; but the entire parish contains 12,841 persons.

WICKLOW, a maritime county in the province of Leinster, in Ireland, is bounded N. by the county of Dublin, N.W. and W. by Kildare, S.W. by Carlow, S. by Wexford, and E. by the Irish Channel. It lies between 52° 40′ and 53° 14′ N. lat., and 6° and 6° 47′ W. long. The greatest length N. to S. is 38 miles; the greatest breadth E. to W. is 33 miles. The area is 781 square miles, or 500,178 acres, of which 280,393 are arable, 200,754 uncultivated, 17,600 in plantations, 341 in towns, and 1090 under water. The population in 1861 was 86,479, of whom 70,044 were Roman Catholics.

Physical Aspect.—The northern part of the coast consists of low cliffs of the clay-slate formation succeeded by a steep shore, which is continued for about 18 miles to the stream that separates Wicklow from Wexford. Total length of the coast line, about 36 miles. The only harbours are formed by the mouths of the rivers Dargle, Vartry, and Avoca, and these are unimportant. The shore, moreover, is very dangerous on account of numerous sandbanks, the N. and S. extremities of which are marked by floating lights. There are also two fixed lights on Wicklow Head.

Mountains.—Wicklow is covered by the mountains which skirt the great limestone plain of central Ireland on the south-east. They may be regarded as part of an extensive range crossing this portion of the country in a S.S.W. direction from the coast about Dublin Bay to the junction of the Barrow and the Suir, near Waterford. The central part of the range consists of a mass of granite, protruding through the slate rocks, the ends of which, though much shattered and confused, abut on each side against it. The slate rocks occupy the rest of the county on each side of the granite, and form summits of somewhat less elevation on its flank, extending on the one hand towards the sea, and on the other towards the great central limestone plain, no part of which is, however, in this district. Indeed, Wicklow is the only part of Ireland in which neither primary nor secondary limestone is to be found. It is altogether occupied by crystalline or schistose rocks.

The eastern flank of the mountains presents a varied aspect, being worn into deep glens and dells, which are lined with abrupt precipices or occupied by small lakes, from whence begin those narrow transverse valleys whose general course to the S.E. is distinguished by the most beautiful and romantic scenery. The chief of these are Glenmalur, Glen of Imail, Glen of the Downs, Devil's Glen, and the Vale of Avoca, the latter the scene of Moore's melody, 'The Meeting of the Waters'—

> 'There is not in the wide world a valley so sweet,
> As that vale in whose bosom the bright waters meet.'

The western side of the mountains, on the other hand, presents less variety: the glens and valleys, which exhibit fewer features of attraction, being more rounded and expanded. The rivers rising in these have a general tendency towards a N.W. direction. On both sides of the central range the transverse valleys either merge into or cut across more expanded longitudinal vales by which heights are flanked, and beyond which rise offsets or detached groups and parallel ranges of lower hills. The general elevation of the Wicklow mountains is from 1000 to 2000 feet. Table Mountain, near the head of the Slaney, is 2302 feet high. Lugnaquillia, near the source of the Little Slaney, 3039 feet, is the highest point. Most of the rocks are bare at their summits, but their base is generally covered with fine oaks and beeches. The well-known Irish weapon, the 'shillelah,' derives its name from a wood near Arklow, which is celebrated for its growth of oak and blackthorn. There are some plains of considerable size on the E. and S. shores.

The rocks on the eastern flank of the granite abound in metals, while on the west there is a total absence of them. Galena, green and white lead ore, and copper pyrites are found in the granitic district. The ore is smelted in small blast furnaces, with the aid of turf, lime, and a small portion of the purest blind coal. In the clay-slate tract are found silver, copper, iron, lead, zinc, tin, tungsten, manganese, arsenic, and antimony, The metalliferous portion of the clay-slate district is small, extending in length only from the border of the county, at Croaghan Kinshela, 10 or 11 miles in a N.N.E. direction, and having but a small breadth. The discovery of native gold near Croaghan Kinshela mountain, in the parish of Arklow, took place about 1796, and many hundreds of people assembled daily to search for the precious mineral in the bed and on the banks of the Ballinvalley, or Goldmine River, a stream which rises in the mountain, and joins the Daragh just above its junction with the Avoca. Government took up the matter, and regular stream-works were established, but they were destroyed in the insurrection of 1798. They were resumed in 1801, with the addition of works for the discovery of auriferous veins; but the search was unsuccessful, and the attempt was abandoned.

Hydrography.—The central mountain range divides the county into two slopes, the eastern and the western. The former is drained by the Dargle (12 miles long), the Vartry (18 miles long), the Three Mile Water (6 miles long), the Potter's River (7 miles long), and the Avoca; the latter by the Liffey and the Slaney, with their respective affluents. These two last-mentioned rivers, although draining the western slope, afterwards turn eastward, and passing through openings in the mountain range, fall into the Irish Channel, as well as the rivers which drain the eastern slope.

The Avoca is formed by the combined water of the Avon-More (22 or 23 miles long), and the Avon-Beg (15 miles long). From their junction the river, now called Avoca, flows 9 miles to the sea below Arklow, receiving on its right bank the Daragh, or Derry (16 miles long), into which the Goldmine river (4 miles long) and the Ow (10 miles long) both fall.

The Liffey has a course of 19 or 20 miles, first W.N.W., then S.W. (partly within and partly upon the border of the county), to the place where it quits Wicklow altogether to enter the county of Dublin, to which it chiefly belongs.

The Slaney rises on the northern slope of Lugnaquillia, and flows in a winding channel 12 miles W., to a little below its junction with the Carrigower; it then turns S., and flows 6 miles, by Baltinglass, into Carlow, to which county, and to Wexford, the lower part of its course belongs. Its whole length in Wicklow is about 18 miles.

Some of the streams in this district are rapid in their current, and occasionally form striking waterfalls. The lakes are all small, but most of them are situated in scenes of surpassing loveliness. The principal are Loughs Day, Tan, Bray, and Glendalough.

Climate, Soil, &c.—The climate of the county is exceedingly mild and agreeable. The soil is very fertile in the lower tracts and along the river-courses. The crops are chiefly oats, potatoes, and wheat. Pasturage is also much attended to. The occupations of the people are generally agricultural. The peasantry are quiet and usually industrious; and are stated to be generally handsome, with Roman profiles. The fisheries are neglected, and the manufacture of flannel, once extensive, is now nearly extinct. Mining operations are, however, rather extensively carried on, having been considerably increased of late years. From 10,000 to 12,000 tons of copper ore, and from 1400 to 3800 tons of lead, besides large quantities of sulphuret of iron, are obtained annually. In consequence of the beauty of its scenery, this district is much frequented by tourists visiting Ireland; and in many places there are noble residences in the midst of extensive and well-wooded parks, especially between Bray and the town of Wicklow.

Divisions, Chief Towns, &c.—The county is divided into eight baronies and fifty-nine parishes. It is principally in the united diocese of Dublin and Glendalough and Kildare, but a portion is in that of Ossory, Ferns, and Leighlin. It is in the Leinster Circuit, and the assizes are held at Wicklow. The county sends two members to Parliament. At the time of the last return the total number of electors was 3537. There are no parliamentary boroughs.

The following are the principal towns, with the population of each in 1861:—

Arklow, a seaport and market town, 14 miles S. by W. from Wicklow, stands on the S. bank of the Avoca, about 500 yards from its entrance into the sea. It consists of a main street, called the Upper Town, which is well built, and runs parallel with the river, having a gentle descent towards the sea, near which is the part called the Fishery, consisting of mud cabins. A bridge of nineteen arches crosses the Avoca. There is a handsome church in the Upper Town, and also a Roman Catholic chapel. The shore is skirted by a line of low sand-hills, and the harbour can only be used by the boats employed in the herring and oyster fisheries—about 200 in number. Near the town is the seat of the earl of Wicklow. A desperate encounter took place at Arklow between the royal troops and the insurgents in 1798. Population of the town, 4760; of the parish, 6257.

Baltinglass, a market town on the Slaney, 30 miles W. by S. from Wicklow, is small, and ill built. There are some remains of an abbey, founded in the twelfth century for Cistercian friars; and near the town is the castle of the earl of Aldborough, its chief proprietor. Population, 1304.

Bray, a market town, 16 miles N. by W. from Wicklow, and 12 miles S.E. from Dublin, stands on both sides of a rivulet called the Bray, at its entrance into the bay of Bray. The town, surmounting the steep banks of the rivulet, over which there is a stone bridge, extends about a mile in length. It is a very pretty place, in an exceedingly pleasant neighbourhood—being surrounded by hills on all sides except that towards the sea. It is much resorted to for bathing by the inhabitants of Dublin and other parts of Ireland, and is consequently well provided with hotels, inns, lodging-houses, and other means of accommodation. The 'International' hotel is the largest in Ireland. Great improvements have recently been made here through the enterprise of the late Mr. Dargan, by whom the sea beach was levelled, and a broad esplanade fenced off and laid down in grass. Along the shores several ranges of good houses have also been erected. The principal public buildings are—two churches; a spacious Roman Catholic chapel, with a handsome tower; a Presbyterian meeting-house; two Wesleyan chapels; several schools, two banks, a large range of Turkish baths; fever hospital and dispensary, court-house, fine railway station, &c. The brewing of beer, ale, and porter, is the only manufacture carried on. The river Bray—which is famous for its trout—divides Wicklow from the county of Dublin, so that part of the town belongs to the latter. There is railway communication with Dublin (by two separate lines), Wicklow, and Gorey and Enniscorthy in Wexford. The local affairs are regulated by twelve commissioners; and the population is 4273.

Wicklow, the county town, 25 miles S.S.E. from Dublin, stands on the south side of the estuary of the Vartry, called the Broad Lough, which is formed by a low peninsula running parallel to the coast. Some of the mining and agricultural produce of the neighbourhood is exported, though it is not a port for customs purposes. A little fishing is carried on near the town, but it is confined to small craft, as there is a bar at the entrance to the harbour. Wicklow consists of narrow streets irregularly laid out, being little better than a group of lanes. At the point of the peninsula, which is called the Murrough, is a suburb, that is connected with the town by a bridge of eight arches. There are a church, Roman Catholic chapel, Presbyterian, Quaker, and Methodist meeting houses, county gaol, county court-house, infirmary, the remains of an old castle, and the ruins of a Franciscan friary. Wicklow is the smallest assize town in Ireland. It communicates with Dublin by the Wicklow, Wexford, and Waterford Railway, and is visited for sea-bathing. There are sixteen town and seven harbour commissioners. Population, 3448.

History.—Wicklow appears to have been included in the dominions of the Cauci (Καῦκοι). The Slaney was perhaps the Modonus (Μόδονος) of Ptolemæus; and the Avoca may be safely identified with the Oboca ('Οβόκα) of the same writer. In the division of Leinster and Munster into shires by King John, what is now the county of Wicklow was included in that of Dublin, nor was it rendered independent till 1605.

A remarkably fine group of churches, sometimes called the Seven Churches, remains in the secluded valley of Glendalough, about 13 miles W. from the town of Wicklow. Glendalough, at the time of the Anglo-Norman invasion (1169) was a bishopric, and contained a cathedral and other ecclesiastical buildings, which were then plundered and burnt. Remains exist of several other churches and monasteries, and of some old castles. Tumuli, raths, cromlechs, and other Celtic antiquities, are also met with in the county.

WICKWAR. [GLOUCESTERSHIRE.]

WIDDIN, a strongly fortified town of Bulgaria, and one of the most important military stations in European Turkey, is situated near the frontier of Servia, on the right bank of the Danube, and has 25,000 inhabitants, who trade in rock-salt, corn, and wine. It is the residence of a pasha, and a Greek archbishop; and contains numerous mosques.

WIDGEON. [DUCKS.]

WIDNESS. [LANCASHIRE.]

WIESBADEN. [NASSAU.]

WIFE; HUSBAND and WIFE. The common law treats the wife (whom it calls a *feme covert*, and her condition *coverture*) as subject to the husband, and permits him to exercise over her reasonable restraint. A wife cannot sue separately from her husband for injuries done to her or her property, or be sued alone for debts, unless her husband shall have abjured or been banished the realm; or unless where she is separated from him and has represented herself as a single woman, or where, by particular customs, she is permitted to trade alone, as in London. For injuries to the wife's person or property the remedy is by a joint action. The husband and wife are considered for many purposes as one person; and from this fictitious unity are derived several of the rules of law; as, for instance, that they cannot make contracts with or sue one another. They cannot give evidence touching one another in civil matters, with one exception (6 Geo. IV. c. 16, s. 37). In criminal prosecutions for injuries done by either party to the person of the other, the injured party may be a witness. The husband takes the liability of the wife's debts contracted before marriage; but those debts are only recoverable during her life. A wife is free from responsibility for offences short of murder and treason committed at his instigation. All deeds executed by her are void, unless by virtue of powers given to her or under the guarantee of certain solemnities. A will made before marriage, either by a man or a woman, is revoked by the subsequent marriage of the party who has made it.

No deed of separation (unless it contains an immediate and certain provision for the wife) and no public notice will relieve a husband from the liability to provide his

wife with proper necessaries, or from paying the debts contracted for such necessaries, if she has been driven from his house by his misconduct.

The sentence of separation relieves the husband of his responsibility for his wife's debts contracted after the sentence is pronounced, or, in case of his wife's adultery, contracted after the discovery of the adultery and the consequent separation. By the common law also, a husband is not liable for the debts of his wife contracted after she has quitted his house without sufficient cause, and he has given particular notice to the tradesmen that he will not pay her debts. Nor is he liable for debts contracted while she is living in open adultery. If the separation is obtained by the wife on account of the cruelty or adultery of her husband, the court compels him to maintain her (if her separate property will not enable her to live according to her rank in life) by requiring him to make her an allowance proportionate to his means. [ALIMONY.]

Though a woman cannot take by direct grant from her husband, she can take by a grant made by her husband to trustees for her benefit. She can also acquire lands by descent and by purchase. [PURCHASE.]

By the common law the husband acquires all the personal property which the wife has at the time of the marriage, and also all that accrues to her during the marriage. He also acquires all her chattels real or leasehold interests; yet if a settlement has not been made on her expressly in consideration of her fortune, those portions of her personal property which consist of securities for money or beneficial contracts, and her chattels real, survive to herself, if the securities have not been realized and the chattels real have not been aliened during his life by her husband: a marriage settlement does not deprive her of this right with regard to things in action acquired subsequently to the execution of the settlement, unless it expressly reserves to the husband future as well as present personalty. If a husband requires the intervention of a court of equity for the purpose of reducing into possession his wife's property, the court will require him to make on her a settlement proportionate to the benefit which he derives.

The husband is entitled during his life to the profits of his wife's freehold estates of which she is seized at the time of marriage or during the coverture.

As to the wife's DOWER, see that article.

The Statute of Distribution (22 & 23 Car. II. c. 10) gives to the widow of an intestate husband (if her claim has not been barred by settlement) one-third of his personal property when there is issue of the marriage living, and one-half when there is none.

In Scotland, the jurisdiction in all cases of the constitution and dissolution of marriage is vested in the Court of Session. The rights of the spouses is now chiefly ruled by the Conjugal Rights Act, 24 & 25 Vict. c. 86 (1861). (Sheriff Fraser's *Domestic Relations*, 2nd edition.)

WIFE, ROMAN. [MARRIAGE, ROMAN]

WIGAN. [LANCASHIRE.]

WIGHT, ISLE OF, on the south coast of England, is separated from Hampshire by a channel called the Solent Sea (*Pelagus Solvens* is the Latin name which Bede gives to it). The average breadth of this channel is less than 4 miles. It is narrowest to the west of Yarmouth, where it is contracted to about three-quarters of a mile by a narrow tongue of gravelly beach which projects nearly 2 miles from the Hampshire coast, and at whose extremity is situated Hurst castle. At Spithead, which forms the entrance to the channel from the east, the width varies from 2 to 3 miles. Its current, both with the rising and ebbing tide, is extremely strong. The form of the island is that of an irregular rhomboid or lozenge. The longer diameter from the Foreland on the E. to the Needles Cliff on the W. is 22½ miles; the shorter diameter, from West Cowes on the N. to St. Catherine's Point on the S., upwards of 13 miles; the circumference is about 56 miles, and the area 98,320 acres. It lies between 50° 35′ and 50° 46′ N. lat., and 1° 5′ and 1° 34′ W. long. The population in 1861 was 55,362—26,752 males and 28,610 females—inhabiting 10,357 houses.

Coast and Surface.—The east and west coasts consist mostly of precipitous cliffs. On the west those of Alum Bay, distinguished by their vari-coloured strata, which is owing to the presence of oxide of iron, rise to the height of 300 feet. The unbroken face of a chalk ridge forms the south side of the bold promontory of which the insulated masses of chalk called the Needles were anciently a continuation. The extreme rock is crowned with a lighthouse, 100 feet in height, erected in 1858. From Scratchell's Bay a line of chalk precipices, in many places nearly perpendicular, extends to Freshwater Gate; the western part, called the Main Bench, being 617 feet high, and pierced with numerous picturesque caverns, from 90 to 200 feet in depth. The chalk is continued eastward, the height gradually diminishing till it terminates at Compton. Thence a succession of narrow terraces, in some places quite perpendicular, gradually increase in height to the south front of St. Catherine's Hill, which rises upwards of 400 feet from an elevation of 400 feet above the sea. Here, on the lower cliff, stands an elegant lighthouse, erected in 1840. Its summit is 204 feet above low-water mark. The lighting apparatus consists of one lamp 3½ inches in diameter, with four concentrated wicks, reflected through a lens surmounted by 250 mirrors. From St. Catherine's to St. Boniface, landslips have formed a series of terraces, which have long been firmly settled, and thence to Dunnose occur the ruins of similar land-slips, produced by the action of water on a soft under stratum of blue marl, but more recent, broken, and irregular. From Dunnose northward an almost uniform line of perpendicular cliffs, at Luccombe 200 feet high, gradually decreases in height till it totally disappears at Sandown Bay; but in about half a mile the red cliffs of Yaverland enrich the landscape, and soon rise to the altitude of 200 feet. These are succeeded by the vertical rampart of the chalk range, which, as seen at Culver Cliff, 259 feet high, is similar in character to the Needles promontory, but not so lofty.

The Isle of Wight is one of the most beautiful parts of Great Britain, being finely diversified with hills, dales, woods, towns, villages, and gentlemen's seats. The surface lies for the most part at a great elevation above the sea. A range of high chalk downs extends, with some interruptions and irregularities, from the Culver Cliff on the east to the Needles on the west, and thus forms a kind of backbone to the island. In this range there are three principal depressions: one between Yaverland and Brading, three-quarters of a mile wide, through which the eastern Yar flows; a second between St. George's Down and Carisbrooke, half a mile in breadth, through which the Medina winds; and a third at Freshwater, hardly 100 yards wide, watered by the western Yar. The highest point of the range is Mottistone Down, 698 feet above the sea. Ashey Down is 424 feet, and Afton Down 500 feet. The south side of the island consists of a high range of downs, whose upper part, on the west,

forms a portion of the chalk ridge; on the south the chalk lies in horizontal strata; on the east extend green sandstone and ironsand. A broad valley separates the lofty range of south downs from the central chalk. The north side, which is in general less elevated than the south, is agreeably diversified with wooded hills and pastoral valleys.

The most extensive of the valleys are those of the eastern Yar, alluded to above, which comprise a large portion of the most fertile land in the island. The basin of the Medina, which is in general very narrow, forms the central valley; and the south-western is bounded E. by St. Catherine's Hill, and N. by the chalk ridge. Numerous small streams drain this tract, but as the coast is high, they enter the sea by narrow chasms called Chines. These all owe their formation to a common cause, the action of rivulets and springs which descend from the high land to the sea, and falling over the edges of the cliffs have worn for themselves deep gullies, some of which run inwards a considerable distance from the shore. The most remarkable are Blackgang, Walpan, Ladder, and Cowleage, on the south coast; Luccombe and Shanklin on the east. The latter is a deep glen, very finely wooded, and opening out upon the sea-shore in such a manner as to command a noble marine prospect. Blackgang is bare and sombre, and shaped like a horse shoe. Less known, but in some respects the most picturesque, is Ladder or Chale Chine, where the cliffs are about 200 feet in height. 'The most striking peculiarity of its character is the copious exudation of chalybeate springs from its sides, which are stained with ochreous tints to a very great extent, and their dusky red on the black clay ground gives the appearance of a vast extinguished furnace to the deep hollow.' The culminating point of the island is St. Catherine's Hill, whose summit is 800 feet above the sea.

Rivers.—The Medina rises near the N.E. foot of St. Catherine's Hill, and runs in a narrow valley till near Gatcombe, where its basin widens considerably; it then breaks through the chalk ridge near the centre of the island, flows on the E. side of Newport, expands immediately below the town into a noble estuary, and enters the sea 5 miles to the N., between East and West Cowes. The eastern Yar, or Brading River, has its source near Niton, in the same range of hills as the Medina. It passes through a narrow chasm in the chalk hills between Brading and Yaverland, and forms Brading Haven, which at high water appears like a beautiful lake of 800 acres, but at low water is a surface of muddy sand, traversed by numerous small streams. The western Yar rises near Freshwater Gate, and falls into the sea at Yarmouth; it is an estuary through nearly its whole length, which is less than 3 miles. The Wootton and Newtown rivers are small streams, forming similar estuaries.

Geology.—The whole series of the strata composing the Isle of Wight are exhibited in its precipitous cliffs in a very distinct manner; and some of the phenomena which they present are extremely curious. The N. side of the island consists of the strata above the chalk; the centre and the higher grounds of the S. side, of the chalk; and the lower part of the S. and the S.E. districts, of the strata below the chalk.

The most extraordinary circumstance in the geological structure of the island is the vertical or highly-inclined position of its central chalk ridge and of the plastic clay and London clay immediately N. of it. The strata farther to the N. and to the S. are horizontal, or nearly so, those to the S. being the chalk and underlying strata which remain undisturbed, while those to the N. are more recent formations deposited horizontally and unconformably on the broken edges of the vertical strata. Two great sections of the latter are exhibited by the Culver Cliff and the cliffs of Whitecliff Bay on the E., and by the Needles Cliff and the cliffs of Alum Bay on the W. In Whitecliff Bay the plastic clay and sands form two low perfectly vertical walls. Rounding the cape to the S., the chalk of the Culver Cliff rises to a great height, at an angle of about 70°, dipping N.N.E., and gradually diminishing to about 50°. In Alum Bay a section quite conformable, but more extensive and distinct, is presented. On the S. the lower strata of chalk and chalk-marl are at an angle of about 50° N.N.E., the upper strata of chalk at an angle of about 70°; farther to the N. the plastic clay and its sands, perfectly vertical; still farther to the N. the London clay, also vertical; and farthest, a bed of yellow sand inclined at an angle of 60° or 70° N.N.E. The plastic clay in Alum Bay consists of clays, marls, and sands in countless layers, some extremely thin, of every variety of colour, and most of them, especially when recently cut, inconceivably bright, like the stripes of a ribbon or the streaks of a tulip. 'The scenery of this bay,' says Sir H. Englefield, 'is superior in magnificence to that of any other part of the island. The chalk forms an unbroken face everywhere nearly perpendicular, and in some parts formidably projecting, and the tenderest stains of ochreous yellow and greenish moist vegetation vary without breaking its sublime uniformity. The pearly hue of the chalk under certain conditions of the atmosphere and light is beyond description by words, and probably out of the power even of the pencil to portray. The magical repose of this side of the bay is wonderfully contrasted by the torn forms and vivid colouring of the clay cliffs on the opposite side. The tints are so bright and so varied, that they have not the aspect of anything natural. Deep purplish red, dusky blue, bright ochreous yellow, gray nearly approaching to white, and absolute black, succeed each other with the utmost distinctness of boundary. Headon Hill, the northern extremity of the bay, is 400 feet high. In Totland Bay, which succeeds, the cliffs exhibit alternations of marine and fresh-water strata.' It contains also eight beds of wood-coal, or rather bituminized wood, each about one foot thick, and vertical, like the other layers. The line along which the disturbing force acted that occasioned the vertical position of these strata may be traced as far as Abbotsbury, in Dorsetshire. The whole of the N. side of the island is considered to belong to these formations.

The south coast, from Dunnose to St. Catherine's, is composed in the upper part of chalk and chalk-marl in nearly horizontal strata; the centre is green sandstone, with dark marl underneath, and then ferruginous sand. The region of the Undercliff extends along the eastern and southern coast from Luccombe to Blackgang Chine, and forms a tract of really wild and wonderful scenery, about 7 miles long, and from a quarter of a mile to a mile in breadth. Lofty chalk cliffs of dazzling whiteness rise out of the blue sea into the blue sky, sinking deep at certain points into beautiful bays and flowery valleys, or breaking up into series of terraces, besprinkled with masses of rock, and adorned with thickets of myrtle and roses and geraniums. Owing to its peculiar position it enjoys a singularly genial climate, which is particularly adapted to invalids suffering from pulmonary complaints. The death-rate of the district is the lowest in the kingdom.

Much of the prettiest scenery of the Undercliff lies about the little villages of St. Lawrence and Whitwell, and in the neighbourhood of the picturesque seats of Steephill, Mirables, Beauchamp, Knowles, and Mount Cleeves. At Puckaster Cove Charles II. was once driven ashore by stress of weather.

Soil, Agriculture, &c.—North of the chalk ridge the predominating soil is a stiff clay, extremely well suited for the growth of wood, and especially oak, which, in the neighbourhood of East Cowes and St. Helen's, grows down to the water's edge. The northern half of the island is much inferior to the southern as arable land. The soil of the whole of the latter is generally a rich red loam, in some parts inclining to sand, in others stiffer and more clayey, but everywhere extremely fertile. Timber does not flourish in these districts. The lower tracts are employed in tillage, and the produce of wheat is greater than in almost any other part of the kingdom. Wheat, barley, and oats are exported to a considerable amount annually, and every kind of pulse and green crops are cultivated. Until within the last few years farming was in a very backward state, but many improvements have recently been effected, chiefly through the example of the late prince consort, at Osborne, near East Cowes. The pastures and meadows are rich, but few oxen are reared. Dairies are attached to most of the larger farms. Numerous flocks of sheep thrive upon the downs, and the Isle of Wight lambs especially find a ready market. The cliffs on the S. side are the resort of vast numbers of sea-fowl. The roads in the island are generally good, but narrow, and all the principal towns are now connected by railway. There is regular steamboat communication with Southampton and Portsmouth.

The climate is very mild, especially in the valleys and sheltered parts of the south side of the island. Laurels, myrtles, geraniums, and various kinds of delicate evergreens, flourish through the winter. The neighbourhood of Bonchurch and Ventnor enjoys very favourable climatic conditions, to which Sir James Clark first directed the public attention. He pronounced it unequalled in England as a winter residence for invalids. The mean annual temperature is as high as 51° 72′. The prevailing winds are W., S.W., and N.W., which blow, on the average, 180 days out of the 365.

Divisions, Towns, &c.—The Isle of Wight is included in the county of Southampton (Hampshire). Its two nearly equal divisions, formed by the Medina, constitute the Liberties of East Medina and West Medina, each comprising a rural deanery. By the Reform Act of 1832 the Isle of Wight was separated from Hampshire for parliamentary purposes, and it now returns one member to the House of Commons, while one is also returned for the borough of Newport.

There are no manufactures of any importance in the island, but agricultural produce, wools, lambs, and white sand from Freshwater Bay, for the manufacture of glass and china, are exported.

The following are the principal towns and places of fashionable resort, with the population of each in 1861:—

Bonchurch, a favourite watering place and secluded village, lies about 11 miles from Ryde, and 1 from Ventnor, on the east coast of the island, with a station on the Ryde and Ventnor Railway. It is one of the loveliest localities in the kingdom, its natural beauties having been judiciously improved by art, and almost wholly consists of elegant villas, planted each in its own grounds, and enjoying a noble prospect of the Channel. Above the village, which is one of the oldest in the Isle of Wight, towers St. Boniface Down, 783 feet, with a well on its summit consecrated to the saint, whose early labours are associated by tradition with this beautiful scene. There are two churches: the ancient parish church is Norman in style, and dates from about 1070. In the graveyard sleeps John Sterling, the friend of Carlyle and Archdeacon Hare. The new church, also Norman in character, is a graceful structure, designed by Mr. Ferrey, and erected in 1847–48. Population of the parish, 564.

Brading is a small town situated on the slopes of two opposite hills on the S.E. side of the island, and consists chiefly of one long street. Several of the houses are ancient, and built of bricks supported by timber framework. The town-hall is a small structure. It has a market-house underneath, but no market is now held. The church is large, and of considerable antiquity, the style being chiefly transitional Norman. The Oglander chapel has recently been carefully restored; it contains an ornamental brass, dated 1441, and some memorials of high interest. The Rev. Legh Richmond, well known for his popular religious works, held the curacy here for some time. Brading, notwithstanding its present insignificance, is an old corporate town, controlled by a senior and junior bailiff, a recorder, and thirteen jurats. Brading Haven admits small vessels when the tide is up. Sir Hugh Middleton attempted to reclaim it from the sea by constructing a dyke, for which purpose he brought over workmen from Holland, but the water broke in, and the attempt was never afterwards resumed. The head of the haven is now traversed by the railway from Ryde to Ventnor. Population of the parish, 3709.

Carisbrooke, a considerable village, picturesquely situated on a bold acclivity, about 1 mile south from Newport, contains some good houses, and is surrounded by much agreeable scenery, but derives its chief interest from its ruined castle and ancient church. The castle occupies the summit of an artificial mound, at a total elevation above the sea-level of 239 feet. It was formerly encircled by a broad deep moat, which is now dry, and overgrown with the smoothest turf. The walls inclose an area of twelve acres. The approach is by a stone bridge, which conducts the visitor to the Gate-House, a noble machicolated structure, built by Antony Woodville, Lord Scales, temp. Edward IV. Entering the castle, the ruins of the apartments in which Charles I. was confined, and from which he vainly attempted to escape, are seen on the left. To the right lie the scanty remains of St. Nicholas' chapel, erected on the site of a former chapel, founded by William Fitz-Osborne, immediately after the Conquest. Nearly opposite stands the governor's house, modernized out of the original hall. During recent repairs, made under the direction of Mr. Hardwicke, some interesting archæological discoveries rewarded the labours of the inquirer. The most ancient portion of the castle is the Keep, which stands on a raised mound, and is ascended by a flight of seventy-four steps. It is a massive polygonal structure of Norman workmanship, and contains a well of great depth. Carisbrooke occupies the site, in all probability, of the old Saxon fortress, Wihtgarabyrig. It was founded by William Fitz-Osborne, the first Norman lord of the island; repaired and rebuilt by Richard de Redvers; enlarged by the Countess Isabella de Fortibus; again by Lord Scales; and completely remodelled as a defensive work, in the reign of Elizabeth, by Gianibelli, the famous Italian engineer. It was unsuccessfully besieged

by the French in 1377, and seized by the Parliament at the outbreak of the Civil War in 1640. Charles I. was confined here, as already stated, and it was used as a prison during the Commonwealth, and for French prisoners of war during the great revolutionary struggle. Carisbrooke church is a large and handsome structure, chiefly early English, with a stately perpendicular tower, which is built in stages, and embattled with an octagonal turret. Of Carisbrooke priory, founded by Fitz-Osborne about 1070, no remains are extant. A Roman villa was discovered here in 1858, which evidently belonged, from its size and ornamentation, to a person of distinction. The population of the parish, which extends over 8800 acres, is 7502.

Cowes, West and *East*, are situated respectively on the west and east sides of the mouth of the Medina, here half a mile across. *East Cowes* is a small place, with only 1954 inhabitants, but it contains the custom-house for the whole island, an Episcopal chapel, and a collection of villas, called East Cowes Park, stretching up a tolerably steep hill. At Slatwoods, in this neighbourhood, was born Dr. Arnold, the late illustrious head-master of Rugby, and the historian of Rome. About a mile from East Cowes lies Osborne, the marine residence of the queen. The present mansion was built about 1841-42, from the designs of Mr. Thomas Cubitt, assisted by the late prince consort. The style employed is Palladian. The campanile, or bell-tower, is 90 feet high; the flag tower, 107 feet. The interior is rich in works of art and vertu, while the arrangement of the grounds everywhere exhibits the most refined taste. The model farm presents many notable features, and the various lodges and cottages on the estate, which comprehends a circuit of 8 miles, are not only built with architectural excellence, but with considerate regard to the comfort of their occupants. Osborne is situated in the parish of Whippingham, and the church has been recently rebuilt at the expense of her Majesty. It contains a memorial to the prince consort. Population of the parish, including the hamlet of East Cowes, 3915.

West Cowes is built at the bottom and on the side of a steep hill, and has a fine appearance from the sea. The lower streets are narrow and irregular, but the upper part of the town is picturesquely situated, and there are many elegant villas and gentlemen's seats in its vicinity. The town-hall and market-house is a very plain building. The old church was built in 1653, and enlarged in 1811. Another church was consecrated in 1832. There are three or four places of worship for dissenters. West Cowes castle was erected by Henry VIII. about 1538–39. Here Sir William Davenant, the poet, was imprisoned in 1651. It was sold by the government in 1856–57 to the Royal Yacht Club, who have almost entirely rebuilt it, converting it into a picturesque and commodious club-house. The club, which now includes 160 members, and has upwards of 120 yachts enrolled on its list, was founded in June, 1815. The annual regatta, occurring in the first week of August, is one of the most attractive sights of the island. The harbour and roadstead of Cowes are amongst the best and most convenient in the English Channel, and many outward and homeward bound vessels touch here before proceeding on their voyage. There is also a good coasting trade. The number of vessels registered as belonging to the port in 1867 was 215 (11,597 tons). The number of entries in 1866 was 764 (50,487 tons), and the clearances 349 (14,173 tons). The customs revenue in 1867 was 4801*l.* The town contains a celebrated dockyard and shipbuilding establishment. The Marine Parade is a finely situated range of handsome mansions. West Cowes is connected with Newport by a short line of railway; with East Cowes, on the opposite bank of the river, by a steam ferry, and with Portsmouth and Southampton, from both of which it is about 11 miles distant, by frequent steamers. The town is in the parish of Northwood, and the parish church, which is built of stone and plaster, is fully 2 miles distant. Population, 5482.

Newport, the capital town of the Isle of Wight, and a municipal and parliamentary borough, is situated in a valley near the centre of the island, on the west bank of the Medina, which is navigable for small craft up to this point. The tide flows nearly to Newport bridge, and carries large barges to the quay, which is built in front of the town, where the Carisbrooke stream falls into the Medina; but since the construction of the railway from Newport to West Cowes the river traffic has been reduced to a minimum. The town is built on an easy ascent, and the streets, which are sufficiently wide, cross each other at right angles. The town-hall and market-house form a neat structure. It was erected in 1816 from the designs of the architect Nash, at a cost of 10,000*l.*, and contains a fine statue of Sir Thomas Fleming, lord chief justice, temp. James I. The Isle of Wight Museum, in Lugley Street, possesses a valuable collection of antiquities. The Isle of Wight Institution, which is a public library and reading-room, is an elegant building. The Free Grammar-school is a large stone edifice, erected in 1619. The conferences between Charles I. and the Parliament were held in the school-room. The negotiations between the king and the parliamentary commissioners, fifteen in number, were protracted over a period of three months, and terminated, November 27, 1648, in the so-called Treaty of Newport, whose provisions, however, were speedily broken by both parties. There are two assembly-rooms, and a small but neat theatre. The church, dedicated to St. Thomas à Becket, is a structure of more than ordinary elegance, built in 1854–56, from the designs of Mr. Dankes, in the early decorated style. Its western entrance is elaborately enriched with carved stonework. The tower is 132 feet high. The interior contains an ancient font, of curious workmanship, an old stone pulpit, a monument to Sir Edward Horsey, formerly governor of the island, and the queen's memorial to the Princess Elizabeth, daughter of Charles I., who died at Carisbrooke castle, September 8, 1650, consisting of a full-length effigy in marble, sculptured by the late Baron Marochetti. There are two other churches, St. John's and St. Paul's; several denominational places of worship; a gaol, &c. Parkhurst prison, for female convicts, is in the neighbourhood of the town; and at Parkhurst, on the West Cowes Road, are important barracks, capable of accommodating fully 2000 men. The reformatory prison is celebrated for its admirable arrangements. Its two buildings will contain 700 prisoners, but the average number of inmates at one time seldom exceeds 430. The house of industry, established in 1770, is managed under a local Act. Parkhurst Forest exhibits but few remains of its ancient glory, consisting now, for the most part, of young plantations. There are, however, some leafy glades to remind the tourist of the time when our English kings came here to 'hunt the deer.' It is a crown demesne. The municipal borough of Newport is divided into two wards, and is governed by six aldermen, one of whom is mayor, and eighteen councillors. The town

has a trade in malt, corn, and timber, and there are some small manufactures of lace, mats, and brushes. Quarter-sessions are held here; and also an ancient governor's court, having extensive power over all the Isle of Wight. The parliamentary borough formerly returned two members to the House of Commons, but it was deprived of one by the Reform Act of 1867. The municipal and parliamentary limits are co-extensive; and include portions of the parishes of Carisbrooke, Northwood, and Whippingham. Population, 7934. Population of the parish only, 3819.

Newtown, on the N. coast, half way between Yarmouth and West Cowes, formerly sent two members to Parliament, but was disfranchised by the Reform Act of 1832. The village, anciently called *Francheville*, was destroyed by the Danes in 1001, and by the French in 1377. It is situated on the bank of a wide estuary, or haven, capable of accommodating vessels of 500 tons; and is included in the parish of Calbourne. The parish church is an interesting early English building. Newtown chapel was rebuilt a few years ago from the designs of Mr. Livesay. Population of the entire parish, 728; of Newtown only, 99.

Niton, a village, at the foot of Niton Down, about 8½ miles from Newport, and 5 miles from Ventnor, is very agreeably situated in the centre of much attractive scenery, and at a convenient distance from Blackgang Chine and the Undercliff. It contains some good houses of recent erection; a literary institute, national schools, and a large and interesting parish church, which retains some Norman features. Here was born, in 1636, Dr. Thomas Pittis, a scholar and divine of some repute, and near the village is the residence of Miss Sewell, the popular novelist. The population of the parish is 700.

Ryde. [RYDE.]

Sandown, a rising watering place, beautifully situated on the shore of a noble bay, between the cliffs of Shanklin on the south, and those of Yaverland on the north-east, is 6 miles from Ryde, and 10 miles from Newport. Its growth in the last few years has been very rapid, owing to the facilities which its fine sandy beach affords for bathing, and the beauties of the surrounding scenery. It contains two good hotels, numerous well-built villas, and large and commodious barracks, which have recently been improved and partially rebuilt. The church, erected in 1845–46, is a graceful early decorated building. The school-house and parsonage are in the same style. The parish church is at Brading, 2 miles distant. Sandown fort was constructed in 1540 by Henry VIII., but rebuilt at a greater distance from the encroaching sea in the reign of Charles I. A new fortress of great strength has recently been laid down in a more commanding position, and formidable defensive works have also been constructed upon Bembridge Down. At Sandown the notorious John Wilkes resided for many years. Two miles to the south lies the pleasant village of Shanklin, with its romantic chine and picturesque cliffs. To the north-east is Yaverland, whose quaint Norman church is worth a visit. Sandown is now accessible by railway from Ryde and Ventnor. The population of the parish of Brading, in which it is included, is 3709.

Ventnor. [VENTNOR.]

Yarmouth, a small but ancient market town, is situated at the mouth of the estuary of the western Yar. It has an excellent roadstead, and communication with Lymington, on the Hampshire coast, is maintained by a daily steam-packet service. Boats also run between Ryde, Cowes, and Yarmouth in the summer. It has a town-hall and market-house, a church, and Methodist and Baptist chapels. The castle, or fort, built by Henry VIII. in 1544, has recently been enlarged and strengthened, and in conjunction with the defences at the Needles, Sconce Point, and Cliff End, and Hurst castle, on the opposite or Hampshire shore, renders the entrance to the Solent impassable by a hostile fleet. The George Inn was formerly the mansion of the governor of Yarmouth. It was built by Sir Robert Holmes, who entertained Charles II. here in 1661 and 1675. The church, a spacious structure, erected in the reign of Charles I., contains a marble effigy of this gallant seaman, by Rysbach. The neighbourhood of Yarmouth is full of interest. At Freshwater, the birthplace of Dr. Robert Hooke, the mathematician, is an ancient church of transition Norman design. Freshwater Gate, on the south-west coast of the island, derives its name from its position at the only gate, or entrance, in the barrier of chalk downs which stretches from Brighstone to the Needles. There is here a formidable battery on the summit of the cliff. The marine views from this point are of great beauty, and among other noteworthy objects are the Arched Rock, Freshwater Cave, the caverns in Watcombe Bay, the lighthouse on Needles Down, the Wedge Rock, and the Main Bench. Faringford is the residence of Alfred Tennyson, the poet laureate. Yarmouth formerly sent two members to Parliament, but was disfranchised by the Reform Act of 1832. Population of the town and parish, 726.

Antiquities, and Gentlemen's Seats.—Apart from the old churches to which we have referred in the preceding remarks, the Isle of Wight contains some interesting memorials of the past. The Longstone, near Mottistone, is generally considered to be the remains of a Celtic *cromlech*, or burial-place, and at Rowborough and Gallibury may be traced the lines of ancient British pit-villages. On the lofty downs are scattered numerous Celtic and Saxon tumuli, or barrows, which have mostly been opened, and their contents may be examined in the museums at Ryde and Newport. The Roman relics are few, and of no importance, except in the solitary instance of the villa recently discovered at Carisbrooke. Quarr Abbey, 3 miles from Ryde, is worth a visit. The ruins of this once opulent foundation, established in 1134, are early decorated in style. At Wolverton, in the Undercliff, are the ivy-clad remains of a very ancient manorial mansion, of about the time of Henry III. The churches at Yaverland, Thorley, and Shalfleet exhibit indisputable Norman features.

The Jacobean mansions and manor-houses are of an interesting character, as Nunwell, the seat of the Oglanders, a family of unbroken Norman descent; Swainstone, Sir J. Simeon, Bart., M.P.; Chale farm; Arreton farm; Mottistone manor-house; Sheat manor-house; Kingston; North court, Sir H. Gordon, Bart.; and Yaverland manor-house.

The other more important seats are:—Westfield, near Ryde, the elegant mansion of Sir Augustus Clifford, Bart.; Appuldurcombe, formerly the residence of the Worsleys; Appley tower, near Ryde; the Priory, St. Helen's; St. Clare, near Ryde; Steephill, near Ventnor; East Cowes castle, and Norris castle, near East Cowes; Brook house; East Dene, the Maples, and Underrock, near Bonchurch; Northwood park, and Fairlie, near West Cowes; Fern hill, near Wootton; and the Marine villa, St. Lawrence.

History.—The word *Wight* is generally supposed to be a corruption of the Celtic *guith*, which, according to Nennius, signifies 'separation,' and refers to the circum-

comprise Glenluce Abbey, Whithorn cathedral, and the castles of Larg, Mochrum, Castle-Stewart, Garthland, Castle-Kennedy, Baldoon, &c.

WILKIE, SIR DAVID, was born at the manse of the parish of Cults, in Fifeshire, of which his father was minister, November 18, 1785. He received some education at the school of Pitlessie, and at the grammar-school of Kettle; but paid little attention to anything except drawing. The bent of his mind being uncontrollable, he was sent, in 1799, to the Trustees' Academy of Edinburgh for the Encouragement of Manufactures. In 1803 he won the ten-guinea premium that was awarded in that year, for the best painting of Callisto in the bath of Diana. In 1804 he left the academy, and returned home, where he painted many portraits in small and in miniature, and the Village Recruit, which he took with him to London, and sold for 6*l*. Wilkie lost no time in obtaining admission as a student at the Royal Academy. His first patron in London was Stodart, the pianoforte-maker, who sat for his portrait, ordered him to paint two pictures, and introduced him to a valuable connection. The earl of Mansfield now commissioned him to paint a picture from his sketch of the Village Politicians; but though it met with general admiration, the liberal patron demurred at giving thirty guineas for it. Wilkie settled in London, where commissions crowded in upon him. His next works were —the Blind Fiddler, Alfred in the Neatherd's Cottage, the Card Players, and the Rent Day; painted in 1807 and 1808. He then painted the Sick Lady, the Jew's Harp, and the Cut Finger. The Ale-house Door, afterwards called the Village Festival, was painted for Mr. Angerstein for 800 guineas, and is now in the National Gallery. In 1809 he was elected an associate of the Royal Academy, and a member in 1811.

In 1814 he went with his friend Haydon to Paris, where he was especially struck with the pictures of Ostade and Terburg. In 1814 and 1815 he painted Distraining for Rent, the Pedlar, and the Rabbit on the Wall. In the summer of 1816 he travelled with Raimbach, the engraver, in Holland and Belgium. After a visit to Scotland, he commenced in 1819 his picture of the Reading of the Will, for the late king of Bavaria, which he finished in the following year. In 1821 he finished his Chelsea Pensioners. This picture, painted for the duke of Wellington for 1200 guineas, is certainly his masterpiece. In 1825 he set out with one or two friends on a continental tour, and during an absence of three years he visited the principal places in France, Spain, Germany, and Italy. After the death of Sir Thomas Lawrence, in 1830, he was appointed painter in ordinary to his Majesty. He afterwards produced many excellent works, among which a few of the historical class can hardly be said to have added to his reputation. In 1836 he was knighted by William IV. In the autumn of 1840 Sir David set out with his friend Mr. Woodburn upon his tour to the East. He went by Holland and the Rhine to the south of Germany, and thence to Constantinople by the Danube. At Constantinople he painted a portrait of the young sultan. Wilkie and his friend went to Smyrna, Rhodes, Beyrout, Jaffa, and arrived at Jerusalem, February 27, 1841. Towards the end of the ensuing April they were at Alexandria, where Wilkie commenced a portrait of Mehemet Ali. He embarked for England, May 21, was taken ill on the voyage, and died June 1, 1841, off Gibraltar. In the evening of the same day his body was committed to the deep.

WILL AND TESTAMENT. Before the passing of the 32 Hen. VIII. c. 7, commonly called the Statute of Wills, and the 34 and 35 of Hen. VIII. c. 5, there was no general testamentary power over freehold land in England. Even the power of disposing of his personalty did not originally extend to the whole of a man's personal estate. At present by the 1 Vict. c. 26, for the amendment of the law with respect to wills (whereby the former statutes there enumerated with respect to wills are repealed, except so far as the same Acts or any of them respectively relate to any wills of estates *pur autre vie* to which this Act does not extend), it is enacted that it shall be lawful for every person to devise, bequeath, and dispose of, by his will, executed as required by that Act, all real and personal estate which he shall be entitled to either at law or in equity at the time of his death. Great alterations have been introduced into the law of wills by this statute; but it does not extend to any will made before the 1st of January, 1838.

WILLENHALL. [STAFFORDSHIRE.]

WILLET (*Symphenia semipalmata*), a bird of the family *Scolopacidæ*, a native of the American continent, about 15 inches in length, with a bill, thick and flattened at the sides, 2½ inches long. The prevailing colour of the upper plumage is a dark gray, but the under parts and upper tail coverts are white. The wings are long, the legs long and muscular, and the feet partially webbed. This bird frequents the coast, and is gregarious in habits. His flesh is much esteemed, and the eggs are also highly prized by the Americans.

WILLIAM I., King of England, styled THE CONQUEROR, was the illegitimate son of Robert, duke of Normandy, and was born in 1027. He succeeded to the duchy of Normandy as William II., on the death of his father in 1035. On the death of Edward the Confessor of England, William laid claim to that kingdom. [EDWARD THE CONFESSOR; HAROLD II.] The defeat and death of Harold at the battle of Hastings, fought October 14, 1066, decided the question. William's coronation took place in Westminster Abbey, December 25, from which day is dated the commencement of his reign.

The Conqueror revisited Normandy in March, 1067, leaving the government of England in the hands of two of his relations. In a few months insurrections broke out in various parts of the country. William returned from Normandy in December, and his first movement was against the city of Exeter, the head-quarters of an insurrection which had broken out in the south-west. At the head of it were the two earls Edwin and Morcar; they were compelled to make their submission. A second rising was as speedily put down; but in the course of the succeeding summer of 1069, first the three surviving sons of Harold landed at Plymouth from Ireland, in June, with a fleet, and then, in July, Canute the son of Sweyn, the Danish king, appeared on the eastern coast at the head of a much more formidable armament. The Irish invaders were driven back, but the Danes were joined by the inhabitants of Yorkshire and Northumberland, and a struggle ensued, in which William came off victorious. From this time William ruled his kingdom like a true conqueror. The natives of the country were reduced to a state of complete slavery. All the offices, both in the church and the state, from the highest to the lowest, were, with scarcely an exception, filled with Normans and other foreigners. In 1072 the Conqueror, having reduced all England to submission, led a great army across the northern border to chastise the Scottish king, Malcolm Canmore, who, in support of Edgar Atheling, had been making aggressions upon the English

dominions. William marched without resistance as far as Abernethy, where Malcolm met him, and made his submission. In 1078, during a visit of William to Normandy, a number of his Anglo-Norman barons entered into a confederacy to drive him from the throne. Their conspiracy being detected, they were hurried into an armed rising before their plans were mature, and their forces were dispersed. William, on his return, led a powerful army into Wales, and established his dominion over that country. In order to provide against a threatened invasion in 1085 by Canute, who had now succeeded Sweyn as king of Denmark, William revived the odious tax called the Danegelt.

The dispute between the Conqueror and his eldest son Robert, to whom he had promised, but afterwards refused, to resign his hereditary duchy, belongs to the latter years of his reign. A reconciliation was at last effected by the intercession of Queen Matilda. In 1087 a sarcasm uttered by Philip of France on the corpulency of William, infuriated the Norman; he collected an army, and on the 10th of August attacked, took, and burnt Mante, formerly belonging to Normandy. He was looking at the conflagration, in which many of the inhabitants perished, when his horse stumbled on some hot embers, and threw him forward on the pommel of the saddle, by which he was so much injured that he died, September 9, 1087.

WILLIAM II., King of England, surnamed *Le Rouge* ('the ruddy faced'), which the Latin chroniclers have inaccurately translated *Rufus* ('the red-haired'), was the second of the three surviving sons of William the Conqueror, and was born in Normandy in 1056.

On the death of his father he assumed the sovereignty of England, in defiance of the claims of his elder brother Robert, and was crowned at Westminster, September 26, 1087. Robert, who at the time of his father's death was living in exile at Abbeville in France, immediately repaired to Rouen, where he was acknowledged as Duke of Normandy. An insurrection broke out afterwards in all parts of England, but was soon suppressed. This was followed by a revolt of many of the Norman barons against Duke Robert. After this civil war had continued for some time William landed in Normandy at the head of an army, January, 1091. But the two brothers did not try their strength in battle. Robert having applied for protection to his feudal lord, Philip I. of France, by his mediation a peace was concluded at Caen. In the latter part of 1091 William Rufus marched an army against Malcolm king of Scotland; but the latter, without hazarding a battle, consented to do homage, and William returned to England. The Scottish war broke out again two years afterwards, when Malcolm was slain, November 13, 1093. William made two campaigns, with little success, against the Welsh in 1094 and 1095. In 1096 Robert sold the duchy of Normandy to his brother William for 10,000*l*. While hunting in the New Forest, August 2, 1100, he was shot dead by Sir Walter Tyrrell, as it was said, who, aiming an arrow at a deer, struck the king by accident; but the story rests merely on tradition. William Rufus was never married, and the genealogists have not assigned to him any natural children.

WILLIAM III. [NASSAU, HOUSE OF.]

WILLIAM (HENRY) IV., King of England, was the third son of King George III., and was born at Buckingham House, London, August 21, 1765. In June, 1779, he was rated as a midshipman on board the *Prince George*, of 98 guns, under Rear-admiral Digby. In 1781 he served under Admiral Darby, and again under Digby in North America. In 1782 he served under Elphinstone (afterwards Lord Keith), and under Sir S. Hood. In 1783 he went to the Continent, where he passed two years, chiefly at the court of Berlin. In 1785 he was made lieutenant, and in 1786 captain of the *Pegasus*. He returned home without orders, for which, as a punishment, he was despatched to the West Indies in command of the *Andromeda*, and he remained at Jamaica till the spring of 1788. In May, 1789, he was raised to the peerage, with the titles of Duke of Clarence and St. Andrew's, and earl of Munster; and an income of 12,000*l*. a year was settled upon him. The next year he was promoted to the rank of rear-admiral of the Blue; he was made rear-admiral of the Red in 1793, vice-admiral of the Blue in 1794, vice-admiral of the Red in 1795, admiral of the Blue in 1799, and admiral of the fleet in 1801. During all this time, however, his royal highness remained without employment, living on shore as a private individual with Mrs. Jordan, the actress, with whom he had formed a connection in 1791, and by whom he had a family of five sons and five daughters. The eldest son was created Earl of Munster in 1831. In 1797 he was appointed to the office of Ranger of Bushy Park, where he afterwards usually resided. He occasionally took part in the debates of the House of Lords, and in general politics attached himself to the party of the Whig opposition. The ministry of 1806 raised his income and that of each of the other male branches of the royal family from 12,000*l*. to 18,000*l*. per annum. On July 11, 1818, he was married at Kew to the Princess Adelaide Louisa Theresa Caroline Amelia, eldest daughter of George Frederic Charles, duke of Saxe-Meiningen. Their union produced two daughters, both of whom died in infancy. Upon his marriage 6000*l*. was added by Parliament to the income of his royal highness, and a farther increase of 3000*l*. a year was made on the death of the duke of York in 1827. On the elevation of Mr. Canning to the premiership in April of this year, he placed the duke at the head of the Admiralty, as Lord High Admiral, but his royal highness only held the office till the following September, when he returned again to private life. The death of George IV., June 26, 1830, raised him to the throne.

The course of events during the reign of William IV. derived its direction in some degree from the political movements on the continent of Europe. The revolution of the Three Days in Paris, the dethronement of Charles X., the transference of the French crown to the duke of Orleans, and after the lapse of another month the commencement of the similar revolution in Brussels which terminated in the separation of Holland and Belgium, was followed in England by much popular excitement. The new Parliament, elected after the accession of the new king, met October 26, 1830. The announcement of the resolution of the ministry to oppose a reform of Parliament, November 14, was followed by the resignation of the duke of Wellington, Sir Robert Peel, and the other ministers; and within another week the Grey administration was in office under the banner of parliamentary reform. On March 1, 1831, Lord John (now Earl) Russell, moved in the House of Commons the first reading of the first Reform Bill. The second reading was carried by 302 votes against 301. But on April 20 ministers were beaten, and the Parliament was dissolved. The new Parliament assembled on June 14, and the second Reform Bill was carried in the House of Commons; but in the Upper House, on October 3, the second reading was negatived by a majority of 199 to

158. On the 20th Parliament was prorogued. A new session commenced on December 6; and on the 12th Lord John Russell introduced the third Reform Bill. The second reading was carried in the House of Lords, April 13, by a majority of 184 against 175. But on May 7 ministers were defeated by a majority of 151 to 115, on Lord Lyndhurst's motion for postponing the consideration of the first (or disfranchising) clause of the bill; on which they immediately resigned. On the 17th Earl Grey and his friends were again in power; and on June 4 the Lords passed the bill by 106 voting for the motion and only 22 against it. Three days afterwards it received the royal assent, and became law.

The Parliament which had passed the Reform Bill was dissolved on December 23; and the first parliament elected under the new system of representation assembled January 29, 1833. On the death of Earl Spencer in 1834, by which Lord Althorpe, the chancellor of the Exchequer, was removed to the Upper House, his majesty sent for the duke of Wellington, and directed him to construct a new ministry. On December 9 Sir Robert Peel was gazetted as first lord of the Treasury, the duke of Wellington as foreign secretary, and the cabinet was completed by other names belonging to the conservative or anti-reform party. On the 30th Parliament was dissolved. On the day on which the new House of Commons assembled, February, 1835, ministers were beaten on the question of the speakership by a majority of 316 against 306. They continued in office till April 7, when Lord John Russell carried a motion against them on the Irish tithe question by 285 to 258. They resigned the next day, and on the 18th the reform party were again in power, with Lord Melbourne as premier, whose administration lasted for the remainder of the reign. Its most important measures were the several municipal reform acts. [MUNICIPAL CORPORATIONS.] William IV. died at Windsor, after a short illness, June 20, 1837. He was succeeded by Queen Victoria.

WILLIAM OF MALMESBURY. [MALMESBURY.]

WILLIAM OF WYKEHAM. [WYKEHAM.]

WILLIAM, PRINCE OF ORANGE and COUNT OF NASSAU, surnamed 'the Silent,' the founder of Dutch independence, and a statesman and warrior of the highest genius, was born at Dillenberg, April 16, 1533. By the death of his nephew, René, while very young, he succeeded to the principality of Orange and extensive domains in the Low Countries, and in right of his father he inherited the German estates of the counts of Nassau-Dillenberg. He was educated in the Roman Catholic religion, and at the age of fifteen became a page in the court of Charles V., who distinguished him by his special confidence, and carefully trained him in the arts of diplomacy and statesmanship. In 1555, though only in his twenty-third year, the emperor intrusted him with the command of the imperial army on the French frontier, and he showed himself worthy of the trust, not only by his gravity of deportment and courtesy of manner, but by his sagacity, resolution, and felicity of judgment. He had already acquired that control over himself which is commemorated by his sobriquet of 'the Silent,' and the wisest observers predicted for the young statesman and general a career of extraordinary brilliancy.

On the abdication of Charles V. he was confidentially employed by Philip II., and was one of the four hostages appointed to reside in France, in accordance with the stipulations of the treaty of Cateau-Cambresis (1559). Acquiring the esteem of Henry II., he was secretly informed by that monarch of the atrocious project concocted between France and Spain for the wholesale massacre of the heretics in both countries. His genius for silence here served him admirably. Though bred a Catholic he was a Lutheran at heart, and he silently resolved to thwart the execution of the scheme so far as the Low Countries were concerned.

On his return to the Netherlands he at once stood forward as the champion of the liberties of his countrymen, though every effort was made by the Spanish authorities, the regent Margaret of Parma, and her astute councillor, Cardinal Granduelle, to seduce him from the popular side. He protested against the increase in the number of bishoprics, against the severe edicts designed for the suppression of heresy, and, finally, against the establishment of the Inquisition, incurring by his energy and eloquence the deadly hatred of Philip II. Nevertheless, he pressed the adoption of moderate measures upon his fellow nobles, who had formed the famous confederacy of Gueux ('Beggars'), in 1566, and sought to effect a peaceable compromise between the throne and the people. Becoming convinced of the miserable duplicity of Philip II., he warned the popular leaders, Counts van Hoorn and Egmont, against the king's designs; but finding them lulled into a credulous lethargy by the blandishments of the regent and the royal promises, he quietly withdrew from Brussels and retired to his own estates. He thus escaped the fate which befell the two patriotic nobles, who suffered on the scaffold, June 4, 1568; but was declared a rebel and stripped of his dignities.

To reduce the discontented provinces to submission a large Spanish force was placed under the command of the duke of Alva, a man scarcely less distinguished for his ferocious cruelty than his military capacity. The prince immediately abandoned all hopes of a peaceful settlement, and disposing of his plate and jewels, equipped four armies for the invasion of the Netherlands (1569). At first he was completely unsuccessful; three of his armies were destroyed, and the fourth, under his own command, could not keep the field for want of supplies. Patience, however, is a virtue of the highest genius, and the prince renewed his enterprise in 1572, with the effect of stimulating a patriotic spirit in Holland, Zeeland, Overyssel, Geldres, and Utrecht. These provinces rose unanimously against the tyranny of Spain, but nominally professed allegiance to the Spanish monarch. William was declared their stadtholder, and the insurrection began in earnest, with the view, not of severing the connection with Spain, but of securing the traditional rights and liberties of the people.

In the field the prince was still unable to cope with the veteran soldiers of Spain, led by the most consummate general of the age. He lost Antwerp and Haarlem, and only secured Leyden by breaking the dykes. Neither his spirit nor that of his countrymen was broken by these or other disasters, which were in some degree compensated by the successes of the Dutch fleet. In March, 1575, the provinces of Holland and Zeeland formally renounced allegiance to the Spanish crown, and soon afterwards the revolt extended throughout the whole of the Low Countries. The north and south coalesced against their common oppressors, and by the 'Pacification of Ghent' in 1576, declared open war.

In these pages it would be futile to attempt even an outline of the important and interesting events which followed, and which have been described so graphically by Mr. Lothrop Motley, in his 'Rise of the Dutch Republic,' and 'History of the United Netherlands.' Alva was succeeded by Alexander Farnese, prince of Parma; Spain poured in her best troops by thousands

upon thousands; but the spirit of the Dutch proved unconquered and unconquerable. By the conclusion of the Union of Utrecht between the seven northern provinces, in 1579, the foundations of the Dutch republic were firmly and unalterably laid. On the 29th of September, 1580, they declared their independence, and raised William of Orange to the sovereign power. Foiled in open warfare, the Spanish court resorted to secret treachery to rid itself of an opponent so formidable, and was well seconded by the Romish church, which thundered its anathemas against the heretic prince. A reward of 25,000 gold crowns was offered by the one, and absolution and all kinds of spiritual blessings by the other, to any faithful son of the church who would deliver Europe from such a monster. Several unsuccessful attempts were made to assassinate him, but the prince disdained the precautions urged upon him by his friends, and at length, on the 10th of July, 1584, he fell a victim to the knife of a fanatic, named Balthazar Gerard, as he was quitting his palace. He was succeeded in the stadtholdership of Holland by his son Maurice, a captain of brilliant genius, who finally effected the deliverance of his country from the Spanish yoke.

WILLIAMSBURG. [VIRGINIA.]

WILLOW-HERB, the common name of the plants belonging to *Epilobium*, an extensive genus in the natural order *Onagraceæ*. *E. angustifolium*, Narrow-leaved Willow-herb, is found in moist shady places in the north of England and in the south of Scotland.

WILLOWS. [SALIX.]

WILLUGHBEIA, a small East Indian genus of the natural family of *Apocynaceæ*.

WILL O' THE WISP. [IGNIS FATUUS.]

WILMINGTON, a city and port of entry of Delaware, United States of North America, is situated on the Christiana Creek, immediately above its junction with the Brandywine, 2 miles from the Delaware River, 28 miles S.W. of Philadelphia, and 70 miles E.N.E. of Baltimore by the Philadelphia, Wilmington, and Baltimore Railroad. The upper part of the city is built on the southern slope of a hill, the summit of which is 110 feet above the tide level, and commands an extensive view of the Delaware River, and the town itself. Wilmington is regularly planned, with wide and straight streets, and is generally well built of brick. It contains twenty-nine churches, one of which was built in 1698. There are also a town-hall, a large hospital and almshouse (situated on high ground in the western part of the city), a Catholic college, a custom-house, public library, five banks, and several schools and insurance offices. Five newspapers are published here.

Wilmington is the capital of Delaware, and by far the most prosperous and populous town in the state. It is celebrated for its manufactures, of which the principal are iron steamboats, railway cars, steam-engines, railroad wheels, mill machinery, and other iron articles; powder, carriages, flour, leather, shoes, cotton and woollen goods, and farming implements. There are large flour mills on the Brandywine, which annually grind about 1,000,000 bushels of wheat. The Christiana is navigable up to the town for vessels drawing 14 feet of water. Some of the inhabitants are engaged in the whale fishery. The population in 1867 was about 26,000, having been doubled in fifteen years.

WILMINGTON, a city and port of entry of the United States, in North Carolina, is situated on the left or E. bank of Cape Fear River, just below the entrance of its N.E. branch, 34 miles from the sea, 180 miles N.E. of Charleston, and 416 from Washington. It is the largest and most commercial place in the state, the business and population having been greatly increased by the construction of the Wilmington and Raleigh Railroad, which extends N. to Weldon, on the Roanoke River, 162 miles, and forms part of the great highway between the North and South. Another line, 156 miles in length, connects it with South Carolina. More than twenty steam-engines are employed in the manufactories of Wilmington, among which are seven steam saw mills and two planing mills, three rice mills, ten turpentine distilleries, and several machine shops. Opposite the town are fine rice-grounds. The harbour admits vessels of 300 tons, and the port has an extensive commerce. During the late civil war it obtained great notoriety as one of the chief ports in the Confederacy, and was frequented by blockade runners. It was captured by the Federals in January, 1865. The population in 1860 was 9553.

WILNA, VILNA, or VILNO, a government of West Russia, formerly part of ancient Lithuania, is situated between 53° 35′ and 56° 24′ N. lat., 21° 5′ and 26° 40′ E. long., and bounded N. by Courland, E. by Vitepsk and Minsk, S. by Grodno and Poland, and W. by Prussia and the Baltic. Its area is 16,250 square miles, and the population in 1866 was 902,487.

The surface presents an extensive and rather elevated plain, diversified by forests and hills, the highest of which does not rise more than 1100 feet above the sea: in the low grounds are many marshes and bogs. Some districts are too sandy for vegetation, but in many parts there is a rich mould productive of all kinds of grain and useful plants. Here and there are found blocks of granite, and fossil bones of elephants and other animals. The progress of cultivation has thinned the forests, but there are still woods of great extent covering the marshes; in fact, they form one of the chief sources of wealth in the government. There are many lakes. Most of the rivers are tributaries of the Niemen, which forms the south-western boundary, and falls into the Baltic. The Düna bounds the government for a short distance on the N.E. The Wilia is the principal river; it rises in Minsk, is joined by the Narocs and the Swienta, and falls into the Niemen at Kowno. The winters, though short, are very cold; the spring is long and humid; the autumn and summer warm, wet, and foggy.

Agriculture is the chief occupation of the inhabitants. Rye is the principal grain crop; barley, wheat, oats, buckwheat, peas, beans, hops, flax, and hemp are likewise grown, and a considerable quantity exported. Fruit is scarce, and of bad quality.

The peasants have only poor ill-fed beasts, horses as well as oxen, cows and sheep, and a few geese and common fowl. On the estates of the nobles the cattle are in a better condition, and there is a good breed of small but spirited and hardy horses, which are in great request for the Russian light cavalry. Bees are kept in great numbers, and the quality of the honey is very superior. The forests not only furnish large quantities of timber and fuel, but provide material for building a great number of craft for the navigation of the Düna, Wilia, and Niemen. The timber is also floated down those rivers for export. The principal trees are fir and pine. Charcoal, pitch, tar, potashes, and lampblack are made. Elks, deer, wolves, gluttons, foxes, martens, and squirrels abound; and in a wooded valley near Letewik there are still some wild cattle (aurochs), which no one is allowed to kill without special permission from the government. As late as the reign of Charlemagne

these animals (which are some of the most massive of all existing quadrupeds) were not uncommon in Germany, but they are now fast becoming extinct, like the urus, from which the common ox has descended. No living specimens are known except in this forest, and they would doubtless have been exterminated even here, had they not been protected and carefully guarded by the government. A large number of the peasants are employed to make hay for them at different places, to serve for fodder. The last time they were hunted was in 1860—when the emperors of Austria and Russia and the king of Prussia met at Warsaw—and then nine of them were killed. They had not been disturbed before for 108 years.

The minerals of Wilna are bog iron, saltpetre, marble, granite, sandstone, jasper, agates, and chalcedony. Some amber is found on the coast. Although the manufactures have recently increased, they are still unimportant, being chiefly of a domestic kind. The exports, consisting of the produce already named, are sent partly to Riga on the Düna, still more by land-carriage to Libau, and a considerable quantity by the Niemen to Prussia. The inland trade is almost exclusively in the hands of the Jews, who are a scourge to the farmer. Education is in a backward condition. The bulk of the population is Lithuanian, a race distinct from Slavonian and Gothic, with a language akin to Sanscrit.

Wilna, formerly the capital of Lithuania, now of the government of Wilna, is situated in 54° 43′ N. lat., 25° 10′ E. long., at the conflux of the rivers Wilia and Wileyka, 473 miles S.W. of St. Petersburg. It is inclosed by a wall, and surrounded with picturesque hills. On an eminence called the Castle Hill are ruins of an immense palace of the Jagellons. The town-hall, the arsenal, the palace of the government, the theatre, and some palaces of the nobility, are handsome buildings. Among the churches the cathedral, built in 1367, and dedicated to St. Stanislaus, is the most worthy of notice. It contains some good paintings and many chapels, one of which, to the memory of St. Casimir, is built wholly of marble, and is very handsome. The body of the saint is preserved in a silver coffin (made by order of Sigismund III.), which is said to weigh 30 cwt. Wilna is the residence of civil and military governors, and the seat of a Greco-Russian archbishop, and a Roman Catholic bishop. There are in all forty churches, several synagogues, a mosque, and some Lutheran meeting-houses; besides monasteries, hospitals, and other charitable institutions. The University of Wilna, founded as a college of Jesuits in 1578, was restored by the Emperor Alexander I., and was in a very flourishing condition till 1832, when, in consequence of the Polish revolution, it was suppressed, and its museum and library of 200,000 volumes transferred to Kiev. There remain a medico-chirurgical academy, a botanic garden, an observatory, and a theological seminary in the town. The manufactures are few, but a considerable trade in timber and corn is carried on. The population in 1866 was 69,464, including many Jews. The city, built chiefly of timber, with dark and narrow streets, was founded in 1322, and has frequently suffered severely from fire. *Troki* is situated on a lake 17 miles W. of Wilna, and has 2000 inhabitants. It was once the residence of the grand dukes of Lithuania. *Kovno* or *Kowno* is a considerable town, of 25,000 inhabitants, situated 58 miles W.N.W. of Wilna, at the conflux of the Wilia and the Niemen, and surrounded on all sides by those rivers. It is also on the railway from St. Petersburg to Berlin; but notwithstanding these advantages, it has not much trade. Large quantities of good mead are made at Kovno. It was here that the main body of Napoleon's army entered Russia. In the market-place is a rude monument to celebrate the event, which bears the laconic inscription—'In 1812 Russia was invaded by an army of 700,000 men. It re-crossed the frontier, numbering 70,000.'

WILSON, ALEXANDER, was born at Paisley, Scotland, July 6, 1766. In 1779 he was bound apprentice to a weaver for three years, on the expiration of which time he worked four years as a journeyman, and afterwards spent nearly three years as a pedlar. From an early age he wrote poetry, and some of his pieces appeared in the newspapers. In 1792 he published anonymously his 'Watty and Meg,' which some at first ascribed to Burns, to the no small gratification of its author. In 1794 he emigrated to the United States, and in July of that year landed at Newcastle in the State of Delaware, with only a few shillings in his pocket, and immediately proceeded to Philadelphia. After trying various occupations he ultimately turned schoolmaster, and in 1802 he made a contract with the trustees of a school at Gray's Ferry, on the river Schuylkill, about 4 miles from Philadelphia, where he became acquainted with some friends who gave him instruction in drawing birds. In this art he succeeded beyond all expectation; and from that time the ruling passion of his after-life was brought into play. All the time he could spare was devoted to the examination of birds, and making drawings of them in colours. In 1806 Mr. Bradford, bookseller, of Philadelphia, being about to publish a new edition of Rees' 'Cyclopædia,' engaged Wilson as assistant editor. Soon afterwards he explained to Bradford his views of a large work on American ornithology, and the bookseller undertook the publication. In September, 1808, the first volume of the 'American Ornithology' was published in folio, with plates carefully engraved from his own drawings, coloured after nature, and with admirable letterpress descriptions. The second volume was published in 1810, and soon afterwards he set out for Pittsburg on a journey to New Orleans. From Pittsburg he descended the Ohio by himself in a skiff. He started on February 24, and on March 17 moored his boat in Bear Grass Creek, at the rapids of the Ohio, after a voyage of 720 miles. He had made excursions from the banks of the river, as he proceeded, with his gun and drawing materials, in search of new species of birds, of which he made drawings and wrote descriptions on the spot where he shot them. He afterwards walked from Louisville to Lexington, 13 miles, and on the 4th of May set out from Nashville for St. Louis through the wilderness on horseback. On the fourteenth day he arrived at Natchez, in Mississippi, after a journey through swamps and across rivers, which had nearly killed both his horse and himself. The other volumes of his work were brought out in succession, with astonishing rapidity and regularity. The number of his subscribers increased, and before his death included perhaps every royal personage in Europe. In 1812 he was elected a member of the American Philosophical Society. In 1813 he published the seventh volume. He had completed the pictorial materials for the eighth and ninth when he was carried off by an attack of dysentery in his forty-eighth year. He died August 23, 1813, at Philadelphia. The eighth and ninth volumes were completed and published in 1814 by Mr. George Ord, who had been his companion in many of his exploring expeditions. Mr. Ord supplied the letterpress descriptions for these two volumes as well

as a biography of Wilson in the ninth. Three supplemental volumes were afterwards supplied by Charles Lucien Bonaparte, folio, 1825–28.

WILSON, JOHN, professor of moral philosophy in the University of Edinburgh, was born at Paisley, in 1785. At the early age of thirteen he was sent to the University of Glasgow, and five years afterwards was entered of Magdalene College, Oxford. After taking several college honours he graduated B.A. in 1807, and M.A., 1810. His father having purchased an estate on the margin of Lake Windermere, in Westmoreland, young Wilson became a denizen of the Lake country, and there became acquainted with Wordsworth, Coleridge, Southey, and De Quincy. In 1812 he distinguished himself as a poet. He published 'The Isle of Palms, and other Poems,' and this was soon followed by 'The City of the Plague,' a poem distinguished for beauty of expression and delicacy of sentiment. In 1817 *Blackwood's Magazine* was commenced, and Wilson was added to the staff, when he wrote a series of articles, which mainly contributed to the fame of that popular publication. On the death of Dr. Thomas Brown, in 1820, he was appointed professor of moral philosophy in the University of Edinburgh; and his success in the chair was such as to disarm his enemies, and delight his friends. He afterwards devoted himself to novel writing, and produced three works of powerful interest, 'Lights and Shadows of Scottish Life,' 'The Trials of Margaret Lindsay,' and 'The Foresters,' which greatly enhanced his literary fame. In 1826 Wilson succeeded Mr. Lockhart in the literary direction of *Blackwood's Magazine*; and the 'Noctes Ambrosianæ' were among the powerful efforts of his pen. In 1842 he published a selection of his contributions in 3 vols., under the title of 'Recreations of Christopher North.' In 1853, owing to general infirmity and increasing bodily weakness, he was obliged to resign his professorial chair in the Edinburgh University; and a pension of 200*l.* was granted him by Earl Russell. He died at Edinburgh, in 1854. His life, by Mrs. Gordon, his daughter, is full of interesting details. An uniform edition of his works has been published by Messrs. Blackwood, of Edinburgh.

WILSO'NIA, a genus of plants belonging to the natural order *Convolvulaceæ*.

WILTON. [WILTSHIRE.]

WILTSHIRE, an inland county of England, is bounded N.W. and N. by Gloucestershire, N.E. by Berkshire, E. and S.E. by Hampshire, S. and S.W. by Dorsetshire, and W. and N. by Somersetshire. It is compact in form, approximating to a quadrangle, but several small detached portions are surrounded by the adjacent counties of Gloucester and Berks. Exclusive of these districts, Wiltshire is situated between 50° 55′ and 51° 43′ N. lat., and between 1° 29′ and 2° 21′ W. long. The greatest length N. to S. is 54 miles; the greatest breadth E. to W. is 37 miles. The area is 1367 square miles, or 865,092 statute acres. The population in 1861 was 249,311—composed of 122,592 males, and 126,719 females—which was a decrease of 4910, or 2 per cent., since 1851. At the time of the last census there were in the county 53,059 inhabited, and 2347 uninhabited houses; and 248 were in process of building.

Surface and Geology.—The geological formations of Wiltshire consist chiefly of the cretaceous and oolitic series, with their intermediate beds. The chalk, which from its extent may be considered the most striking geological feature of the county, forms the extensive downs which overspread its eastern, central, and southern districts. The great central chalk region is divided into two parts by the vale of Pewsey, where the green-sand occupies the bottom, and is skirted on each side by the chalk hills. As this valley extends E. and W., it divides the chalk region into two portions, of which the Marlborough Downs belong to the northern, and Salisbury Plain to the southern. The southern part of the county is also occupied by the chalk extending E. into Hampshire and S. into Dorsetshire, and forming an extensive elevated tract furrowed by the deep pastoral valleys of the Nadder, the Wiley, the Avon, and the Bourn, which unite near Salisbury in the basin of the Lower Avon. S. and E. of Salisbury upon the chalk lies superimposed the plastic clay formation belonging to the chalk basin of the Isle of Wight. That portion of the southern chalk district known as Salisbury Plain, forms a lofty undulating table-ground, a considerable area of which is still wild, uninclosed, and uncultivated, except in the combes and hollows, where tillage has of late years been more or less successfully undertaken. Wide downs, covered with a scanty herbage, spread in every direction. The population is collected in the valleys, where along the streams which water them, the villages are situated at short intervals. It is owing to these characteristics of the county that its population has recently decreased. Its resources are almost wholly agricultural, but improved machinery has reduced the number of hands on every farm, and the unpromising soil of the high grounds prevents any great extension of cultivation.

The green-sand formation, comprehending the chalk marl with the green-sand, crops out from beneath the escarpment of the two chalk districts occupying the vale of Pewsey, as well as the indentations in the boundary of the southern chalk district.

The outer edge of the green-sand formation is frequently broken up by the Weald or Tetsworth clay, which usually divides the green-sand from the iron-sand. The latter in this county appears only in a few places; and in its absence, the Weald clay rests along the northern and north-western borders on the Kimmeridge clay, which belongs to the uppermost division of the oolitic group.

The formations already noticed occupy the whole of the county S.E. of a line drawn from the Berkshire border near Swindon, to the Somersetshire border near Westbury, the whole line describing a convex circuit from N.E. to S.W. Beyond this boundary the strata of the middle oolites and the lower oolites, comprehending the coral-rag, calcareous grit, Oxford clay, cornbrash, forest marble, and a deep bed of clay, occupy all the N. and N.W. districts.

The most elevated parts of the county are Inkpen Beacon, on the Hants border, 1011 feet; Clay Hill, near Warminster, 900 feet; and Westbury Down, 775 feet.

Rivers and Canals.—Wiltshire is comprehended in the three basins of the Thames, the Severn, and the Avon. The upper part of the course of the Thames is in this county, and here the Kennet and some smaller tributaries have their sources. [THAMES.]

The Wiltshire, sometimes called the Upper, Avon rises in the southern slope of the northern chalk district, in the neighbourhood of Devizes, and flows E.S.E. along the vale of Pewsey to Rushall, in whose vicinity it is joined by another stream, and thence flows S. to Salisbury, where it is joined on the right by the Wiley (united with the Nadder). It is augmented a little lower down, on the left bank, by the Bourn, and still lower by another stream on the right. It then continues S. to Downton, and a mile below that town enters Dorsetshire. Its

from Salisbury, consists chiefly of a long straggling street on both sides of the Wiltshire Avon. The houses are mostly built in the cottage style, with thatched roofs. The church is large and ancient, with a central tower. There are several denominational chapels, a chapel of ease, and two free schools. The manufactures of lace and straw-plait are flourishing. Downton was a parliamentary borough from the time of Edward I. until disfranchised by the Reform Act of 1832. There are some remains of an ancient castle. Population, 3566. Standlinch, or Trafalgar house, for which Parliament voted 100,000*l.* as a national gift to the heirs of Lord Nelson, is within 2 miles of Downton.

Great Bedwin, a market town, 25 miles N.N.E. from Salisbury, consists chiefly of two streets crossing each other at right angles. It was formerly a parliamentary borough, but was disfranchised by the Reform Act of 1832. The church is ancient, the nave being of Norman architecture, and the chancel of early English. There are two denominational places of worship, a town-hall, and a school for poor children, founded by the marquis of Aylesbury. The Kennet and Avon Canal, and a branch of the Great Western Railway, pass through the town, and the trade in coals, timber, and malt, is considerable. Some Roman remains have been discovered in the vicinity, and in 674 a sanguinary battle was fought here between the kings of Mercia and Wessex. Jane Seymour, one of the wives of Henry VIII., was a native of Bedwin. Population of the parish, 2263. The village of *Little Bedwin*, which contains a commodious and neat church, is about a mile N.N.E. from Great Bedwin. Population, 496.

Heytesbury, formerly a parliamentary borough, is 16 miles N.W. by W. from Salisbury, on the Great Western Railway. The town is situated in a valley on the N. bank of the Wiley, and consists of one long street, irregularly laid out. The church is a cruciform building, with a central tower. Population of the parish, with Lytherington, 1214.

Highworth, a market town, 6 miles N.N.E. from Swindon, is pleasantly situated on a hill, on the road between Lechlade and Swindon. It consists chiefly of two irregularly built but well-kept streets; and its inhabitants are mainly employed in agricultural pursuits. The church is late perpendicular, of the time of Henry VI. There are several schools, denominational chapels, and charities. Population of the parish, 3629.

Hindon, a market town, on a gentle eminence, 15 miles W. by N. from Salisbury, consists of one principal street and three shorter ones. The church is a plain building. The manufactures are linen, bed-ticking, and dowlas. Ancient British remains have been discovered in the neighbourhood, and there are some ruins of Fonthill abbey. Population of the parish, 604.

Lavington (*East* or *Market*), 18 miles N.N.W. from Salisbury, is situated in a valley on the N.W. side of Salisbury Plain; the two principal streets cross each other at right angles. The church is of the later or perpendicular architecture. There are several dissenting places of worship. The principal trade is in corn and malt. Population of the parish, 1583.

Ludgershall, 15 miles N.N.E. from Salisbury, occupies a pleasant situation. The church is of irregular form, with a low square western tower. Ludgershall was formerly a parliamentary borough, but was disfranchised by the Reform Act of 1832. The ruins of an ancient castle form an object of interest in the immediate neighbourhood. Population of the parish, 595.

Malmesbury, a market town and parliamentary borough, about 20 miles N.N.W. from Devizes, and 81 miles W. from London, by the Great Western Railway, *viâ* Minety station, from which it is 7 miles distant, stands on a piece of land formed by the junction of the Bristol Avon and a stream from Tetbury called the Newnton Water, and consists of four principal streets irregularly laid out. There are two bridges over the Avon, and two across the stream from Tetbury. There was formerly a wealthy mitred abbey at Malmesbury, founded in the seventh century by St. Maildulf, a Scotch hermit, after whom it seems the place was called Meadelmsbyrig. The historian William of Malmesbury was educated there, and King Athelstan was buried in it. It was afterwards degraded into a cloth-factory. The new town-hall and market-house is a spacious building. There are now two churches—the Abbey church and St. Mary's—and the ruins of a third, old St. Paul's. The Abbey church was, at the dissolution, purchased by the inhabitants, and made parochial. It was a magnificent building, but much of it has fallen, and the part now used stands in the midst of the Norman and early English remains of the original structure. The lofty tower of St. Paul's, still extant, is employed as a belfry. There are several places of worship for dissenters, a free grammar-school, and numerous charities. Thomas Hobbes, the philosopher, and author of 'The Leviathan,' was a native of this town. The principal trade is in wool-stapling and malt. Population of the parish, 2543. The parliamentary borough returns one member: population, 6881.

Marlborough, a market town and municipal and parliamentary borough, 28 miles N. by E. from Salisbury, and 70 W. by S. from London by the Great Western Railway, stands on the N.W. bank of the Kennet, over which there are four bridges. The town consists chiefly of one spacious street lined with houses irregularly built, the modern ones being of brick or stone, the older ones of timber, with quaintly carved fronts. The market-house is an ancient building, having in its upper story a council-chamber, assembly-rooms, and court-house. There are two churches: St. Mary's, an old building, with a tower at the west end, and a Norman doorway enriched with zigzag ornaments; and St. Peter and St. Paul's, with a lofty square tower. Marlborough also contains several dissenting chapels, a national and free grammar schools, besides various charities. The trade in malting, brewing, corn, coal, bacon, butter, and cheese, and the rope and sacking manufactures, are in a prosperous condition. In 1843 a college was founded for 500 pupils, of whom two-thirds must be sons of clergymen; it has seven exhibitions. The pupils are about 300 in number, and the schools enjoy a high reputation. The building is handsome in design, and occupies the site of an ancient castle, where, in the reign of Henry III., was held the Parliament whose enactments were known as 'The Statutes of Marlbridge.' The town gave the title of duke to the great victor of Blenheim and Ramillies. Near it is the celebrated Druidical monument similar to Stonehenge, described in the article AVEBURY. The municipal borough is governed by four aldermen (of whom one is mayor) and twelve councillors: population, 3684. Since the passing of the Reform Act of 1867 the parliamentary borough only returns one member: population, 4893.

Melksham, a market town, 7 miles W. by N. from Devizes, 26 miles N.W. from Salisbury, and 99 from London by the Great Western Railway, consists principally of one irregular street, nearly a mile in length, chiefly along the road from Bath to Devizes, but partly

on that to Westbury. The principal part of the town is divided by the Bristol Avon, over which is thrown a stone bridge of four arches, from a suburb called the City. The houses, mostly of stone, are of neat appearance; and the main street is paved and decently kept. The church, a cruciform building, has some portions of Norman architecture, a handsome central tower, and two chantry chapels on the south side. The town-house is a semi-classical edifice, and the town also contains four dissenting chapels, national and British schools, and the usual local charities. Over some mineral springs in the neighbourhood suitable baths have been erected. Some large corn mills are fed by the river, and the manufactures of broadcloth, kerseymere, and leather are still considerable, although not so extensive as formerly. Population of the town, 2452.

Mere, a market town, 22 miles W. from Salisbury, consists chiefly of one street of indifferent houses, irregularly built along the road from Salisbury to Exeter. The church is a handsome Gothic building, chiefly of perpendicular character, with a western tower. There are a silk-throwing mill, manufactures of dowlas and bed-ticking, and a neat market-house. Population of the town, 2929.

Salisbury is the capital of the county. [SALISBURY.]

Sarum. [SARUM.]

Swindon, a market town, about 41 miles N. from Salisbury, and 2 miles E. from the Swindon station on the Great Western Railway, is situated on a hill commanding an extensive prospect, and consists of five principal streets irregularly laid out, but well built, airy, and neatly kept. The parish church is a decent Gothic building, neatly fitted up within. There are six places of worship for dissenters, and a church for the railway employés erected near the station, where the Great Western Company have their principal workshops, employing 1500 hands. At New Swindon, as this railway colony is called, large and convenient schools have also been built, a market-house, a theatre, and a literary institute; and some excellent charities are in active operation. The old town has a handsome town-hall, several schools, a literary institution, and a well-attended weekly corn market. In the last twenty years the population of the parish has been trebled, having risen from 2172 in 1841 to 6856 in 1861. Its area is 3136 acres.

Trowbridge, a market town, is situated on the acclivity of a rocky hill on the N.E. bank of the Biss, a tributary of the Bristol Avon, 25 miles N.W. from Salisbury, and 105 miles W.S.W. of London by the Great Western Railway. It consists of one large and several small streets, irregularly laid out. The houses are chiefly of stone; and generally of good and substantial erection. The parish church is a spacious perpendicular edifice, with a nave, chancel, two aisles with chapels attached to their eastern extremities, a north and a south porch, and a large western tower and spire. There is a chapel of ease in the town, of early English architecture, and another at Staverton, also in the parish, but about 2 miles north of Trowbridge. Of dissenting places of worship there are eight; schools are numerous; and the town also contains a literary institute, and several local charities. The principal branch of industry is the manufacture of broadcloth and kerseymere, about 32,000 yards being produced weekly. Trowbridge is the largest clothing town in the county, and one of the most prosperous in the west of England. A branch from the Great Western Railway extends from Chippenham through Melksham to this busy and thriving town, and the Kennet and Avon Canal passes at the distance of 1 mile to the north. Population of the parish, 10,487.

Warminster, a market town, on the Great Western Railway, 20 miles W.N.W. from Salisbury, stands in a healthy situation, close upon the western border of Salisbury Plain, in the valley of the Wiley, and about a mile N. from that river. It consists of several streets, the principal one extending along the road from Salisbury to Frome, and its general appearance is neat and respectable. The parish church is spacious and handsome, with a tower of the time of Edward III. The nave and chancel were rebuilt early in the last century. There is also a modern church; and a chapel in the centre of the town, founded as early as the time of Edward I., is now used as a chapel of ease. Warminster also contains several places of worship for dissenters; a handsome town-hall erected by the marquis of Bath, with a suite of rooms for assemblies; literary institute, national and grammar schools; large breweries, extensive foundries, and important manufactures of agricultural implements. The weekly corn market held in the town is a very important one, and there is also a trade in malt. Near Warminster is Longleat House, the magnificent seat of the marquis of Bath. Population of the parish, 5995.

Westbury, a market town and parliamentary borough, on the Great Western Railway, 4 miles N. from Warminster, and 21 miles N.W. from Salisbury, consists of one long crooked and of some smaller streets, irregularly laid out. Westbury Leigh forms a small suburb, separated by an open space from the principal street of Westbury. The church is a large building of the thirteenth century, with a central tower. A handsome town-hall was erected in 1815. There are several dissenting chapels, an endowed school, benevolent institutions, some small manufactures of kerseymeres, broadcloth, and leather gloves, and a considerable trade in malt. Iron ore of good quality has been found near the town, and there are extensive smelting works. The ex-lord chancellor so well known as Sir Richard Bethell, derives his title of Lord Westbury from this place. Population of the township of Westbury, 6495; of the township of Leigh, 113. The parliamentary borough returns one member. Population, 6495. Near the town is a gigantic figure of a white horse cut in the chalk, on the side of a hill, and visible at a distance of 20 miles.

Wilton, a market town and parliamentary borough, 3 miles W. by N. from Salisbury, stands on the S.W. bank of the Wiley, just above its junction with the Nadder. The town consists chiefly of one long street. The church, formerly the abbey church, includes a nave and western tower, which are ancient, side aisles of the Elizabethan period, and a chancel of modern date. A splendid church was erected at the expense of the late Lord Herbert of Lea (whose remains repose in it), and completed in 1843, in the Romanesque style of architecture, with a separate bell-tower, or campanile, which is connected with the main building by a vestibule or cloister. Its total cost exceeded 20,000*l.* Wilton has a station on both the Great Western and South-Western lines; and the manufacture of the best kinds of carpets, for which the town was formerly celebrated, has revived of late years. The town-hall is an ancient plain brick building. There is an hospital founded as early as 1190. Near the town lies Wilton House, the seat of the earl of Pembroke, a mansion of imposing appearance, standing in a noble park and gardens, and containing a fine collection of paintings and antiquities, besides a valuable library. It was here

that Sir Philip Sidney composed a portion of his 'Arcadia.' Wilton was formerly the capital of the Anglo-Saxon kingdom of Wessex, and gave name to the county. Its decay began in 1244, when the Great Western Road, which at one time passed through it from Sarum, was diverted. The monastery, once so famous for its opulence and power, was given by Henry VIII. to Sir William Herbert, first earl of Pembroke. Population of the parish, 1930. The parliamentary borough returns one member; population, 8657.

Wootton-Basset, a market town, on the Great Western Railway, 17 miles N. by E. from Devizes, stands on an elevated site, and consists principally of one street, built chiefly of brick. The church is an ancient structure in the centre of the town, and there are some dissenting chapels and schools. Wootton-Basset was anciently a parliamentary borough, but was disfranchised by the Reform Act of 1832. Population of the parish, 2191.

History and Antiquities.—It is difficult to determine exactly to which of the ancient British nations the various parts of Wiltshire belonged. A large portion, there can be no doubt, was occupied by the nation or nations who are mentioned by Ptolemæus under the generic name of Belgæ (Βίλγαι). After the departure of the Romans, the county became the scene of the prolonged struggle between the Britons and Saxons, and the desperate resistance opposed to the latter is commemorated by the tumuli and camps which crown every lofty eminence, and which render the Downs so fertile a field of archæological investigation. The asserted massacre of the British chiefs by Hengist is said to have taken place on Salisbury Plain; but both the event itself and its locality are doubtful.

Several Roman roads crossed the county in different directions, and many Roman remains have been found. Of the antiquities not Roman the most important are AVEBURY and STONEHENGE. The camps and other earthworks are numerous, but the more interesting memorials of the early Celtic period will be found fully described and illustrated in Sir R. C. Hoare's *Ancient Wiltshire*, and in Higgins' *Celtic Druids*.

WIMBLEDON. [SURREY.]

WIMBORNE MINSTER. [DORSETSHIRE.]

WINCH AND AXLE, a machine constituting a small windlass, and consisting of a cylinder of wood which is capable of turning on its axis between two upright posts of the same material, or between the ends of a cast-iron frame. A lever at one or at each extremity of the cylinder is attached to an iron axle which passes through the cylinder, and is turned at right angles to its direction, and again turned, so as to furnish a handle parallel to the cylinder. When of a simple form it is employed to raise water from a well, earth from the shaft of a small mine, &c.: but when the cylinder or barrel is turned by the intervention of toothed wheels and pinions, in which case the machine is called a *Crab*, it is frequently employed to raise casks or heavy packages from the ground to the upper part of a building. [WHEEL AND AXLE.]

WINCHELSEA. [SUSSEX.]

WINCHESTER. [VIRGINIA.]

WINCHESTER, the county town of Hampshire, a municipal and parliamentary borough, and a cathedral city, 62 miles from London by road, and 67 by the South-Western Railway, stands on the river Itchen, in the midst of undulating chalk downs, and consists of several clean and regular streets, intersecting the High Street, in which stands a fine Gothic cross, 43 feet high. Originally it was a town of the Belgæ, called Gwent (or 'white'), from which the Romans styled it Venta Belgarum, and the Saxons, Wintanceaster. It was the favourite seat of many of the Saxon and Norman sovereigns, and is mentioned in the Domesday Survey. At one period it had as many as ninety churches, some of which were swept away at the Reformation, and others razed in the Civil War, as well as the city walls (except the West gate), and Wolvesley castle, an old seat of the bishops, of which only the keep remains.

The principal buildings are the Cathedral of Holy Trinity, a cruciform structure of various ages, begun in 1079 and finished in the sixteenth century. The character of the building was originally pure Norman, and the transept and central tower, built by Bishop Walkelyn, are admirable specimens of that style. The west front, of decorated Gothic, was built by William of Wykeham, and is very beautiful, but the other parts of the exterior have a somewhat heavy appearance. The interior, however, is very splendid, equalling in many respects the magnificence and beauty of York Minster. The groining varies in different parts of the church, that of the nave being much admired for its intricacy and richness. The dimensions of the cathedral are as follow:—

	Feet.
Extreme length from east to west,	560
Length of nave, 250 / Length of choir, 138	388
Extreme breadth of north and south transepts,	208
Breadth of nave and aisles,	86
Height of nave,	76
Height of tower,	135

The cathedral contains the tomb of William Rufus, and in a series of carved chests over the choir are the remains of many of the kings of Wessex, and of the Saxon kings of England. The altar-piece is the celebrated 'Raising of Lazarus,' by West.

Winchester diocese was founded in 660. It embraces the archdeaconries of Winchester and Surrey, or about 580 benefices, in Hampshire, Surrey, and the Channel Islands. The present bishop's income is 10,500*l.*, and his seat, Farnham castle. He is sub-dean of the province of Canterbury, and prelate of the Garter; and has the patronage of about ninety livings. The dean and chapter have the patronage of twenty-one livings.

Next in importance to the cathedral is St. Mary's or Winchester College, which was founded by William of Wykeham in 1387. The buildings, consisting of two substantial quadrangles and a cloister, were completed in 1393. The foundation originally included a warden, ten fellows, seventy scholars, an informator, or head master, an *ostiarius*, or usher, a second master, three chaplains, three singing men, and sixteen choristers; but there being reason to suppose that its extensive endowments, amounting to between 17,000*l.* and 18,000*l.* yearly, might be more advantageously employed, the system was remodelled by the University commission of 1857. The number of fellowships was reduced to nine (to be ultimately decreased to six), and that of the scholars increased to 100. Twenty exhibitions were also established. The college is governed by the warden and fellows; the visitor is the bishop of Winchester. Besides the foundation scholars, who are elected between the ages of ten and fourteen, and are boarded and educated at the expense of the college, there are about 200 commoners, who board in the houses of the masters, at a total yearly charge, including education and pocket-money, of about 110*l.* each. In connection with the college there are fifteen fellowships and thirty scholarships at the New College, Oxford.

In the Cathedral Close are the bishop's old chapel and palace, by Wren; the Deanery or Hall of St. Swithin's ancient priory; Refectory and Keep of Wolvesley castle, &c. The city also contains eleven churches, most of which, as St. Maurice's, St. Thomas', St. John's, St. Nicholas', St. Lawrence's, St. Bartholomew Hyde, and St. Swithin's, are ancient; five chapels, including the Roman Catholic chapel of St. Peter, which is annexed to a Norman porch of St. Mary Magdalene's decayed hospital. The county hall is 110 feet long, and was formerly a chapel to William the Conqueror's Norman castle, containing Arthur's Round Table. The other buildings include the guildhall, built in 1713; gaol, on West Hill, the site of St. Grimwald's Minster (afterwards Hyde Abbey), in which King Alfred was buried; city police station; Cheyney or bishop's prison; market-house (1859), and Pent House Piazza; corn exchange (1839), 110 feet long; four banks; new market hall; subscription library; museum, in which the standard Winchester bushel and yard are kept; theatre; king's house barracks, built by Wren (as a palace for Charles II.) out of the materials of the Conqueror's castle; hospital of St. Cross, founded 1132, by Bishop de Blois, containing a good Norman church, refectory, infirmary, and hundred men's hall, where thirteen poor men are maintained, and bread and beer are given to any passer-by who asks for them; Bishop Morley's college for clergy widows, founded in 1672; diocesan training college; Symmond's, Christ's hospital (1586), endowed with two exhibitions; St. John the Baptist's hospital, originally a preceptory of the Knights Templar, comprising Over's school (in the old chapel), Lambe's alms-houses, a common hall, &c.; and county hospital (1736). A stone bridge crosses the Itchen. The cemetery is 7 acres in extent, and well laid out. The trade of Winchester is a general one; formerly it possessed a share of the woollen manufacture, but that is now quite extinct.

The city received its first charter from Henry II., and has returned two members to the House of Commons since the 23 Edward I. The number of electors in 1866 was 963. The municipal borough (the limits of which are co-extensive with those of the parliamentary one) is governed by six aldermen (one of whom is mayor) and eighteen councillors. Population in 1861, 14,776; in 1866, 15,343.

WINCING MACHINE, the reel by which the dyer winds various articles through the dyeing vat or copper.

WIND, a current in the atmosphere conveying air from one locality to another, with a greater or less degree of swiftness. An expansion or contraction in one atmospheric region, such as is produced by variation of temperature, or by increase or diminution of the aqueous vapour suspended in the air, produces a wind by disturbing the equilibrium.

There are three classes of wind:—1, Permanent Winds, as the TRADE-WINDS; 2, Periodical Winds, as the MONSOONS; and 3, Variable Winds, as those of the Temperate and Frigid Zones. These will be found noticed under their separate heads.

The Etesian Winds (so called from ἐτησίαι, 'annual') is a designation formerly given only to those which every summer blow during six weeks over the countries bordering the Mediterranean, but it has since been applied to other periodical winds, as those which blow on the coast of Holland. They commence in the Levant about the middle of July, rising at 9 A.M., and continuing during the daytime only: the direction of the current of air is from north-east to south-west; and it is probably caused by the rarefaction of the atmosphere nearly under the tropic of Cancer, in consequence of the heat of the sun at that season.

WIND MEASURER. [ANEMOMETER.]

WINDERMERE. [LANCASHIRE; WESTMORELAND.]

WINDSOR. [NEW SOUTH WALES; NOVA SCOTIA; VERMONT.]

WINDSOR, formerly called *New Windsor*, a municipal and parliamentary borough, in Berkshire, is 21 miles W. by S. from London by the Great Western, and 26 by the South-Western Railway. It derives its importance, and perhaps its origin, from having been a favourite residence of many of the kings and queens of England since the Conquest. The Saxon kings had a palace at Old Windsor, called by them *Windlesora*, or *Windshore*, and Edward the Confessor occasionally kept his court there; but it is now a distinct parish, about 1½ mile S.E. from New Windsor, but with only 1835 inhabitants. It is crossed by a Roman road from SILCHESTER; has an old church containing many handsome monuments; and a new one at Sunningdale Hill. In the reigns of William the Conqueror and William Rufus, Windsor Castle was a military fortress. Henry I. rebuilt it, and held his court there; and from this time it became the frequent residence of the kings of England. It is, therefore, very rich in historical features.

Windsor is, in general, well built, is situated on rising ground on the S.E. or right bank of the Thames, and consists of six principal streets, well paved, besides a number of smaller ones. The main thoroughfare winds close around the W. and S. sides of the castle. Eton, on the opposite bank of the Thames, forms in appearance one town with Windsor, the line of houses being interrupted only by the bridge, a neat structure of iron on granite piers, 200 feet long and 26 feet wide, and consisting of three arches. The public buildings of Windsor (exclusive of those pertaining to the castle) are not very remarkable. The Lower Castle Ward is divided into two parts by St. George's Chapel, which stands in the centre. This chapel was begun by Edward IV. (1461–83), and was not completed until after the commencement of the sixteenth century. It is one of the most beautiful specimens of ornamental pointed architecture in this country, and contains a large E. window filled with magnificent painted glass, and several other stained glass windows, from designs by West; besides the cenotaph of the Princess Charlotte. Edward IV., Henry VI., Henry VIII., and Charles I., were buried here. At the foot of the altar is a subterranean passage communicating with Wolsey's tomb-house (restored in 1864), in which George III., George IV., William IV., and others of the present royal family were interred. The chapel is a collegiate establishment. Windsor chapter includes a dean, four canons, and four minor canons, in whom is vested the patronage of fifty-six livings. The parish church was completed in 1822, in the later pointed style. It contains some fine carved work, an altar-piece presented by George III., and several monuments. The other buildings in the town comprise the places of worship for the various denominations of dissenters; a town-hall, erected in 1866; a free-school, built in 1796, and partly supported by endowments; several other schools, and charitable institutions, a theatre, infantry and cavalry barracks, &c. The aggregate annual revenue of the charities is nearly 3000*l.*, the most important being an hospital for invalid soldiers, established by George III.; a lying-in institution; parish hospital for twelve poor people; royal general dispensary, and almshouses. There is also a

public ground, with an obelisk commemorative of the jubilee of 1810. The town has well-supplied markets, some trade in corn, and is famous for its ale; but the resources of the inhabitants are almost solely derived from the presence of the Court, and the influx of visitors, who come in great numbers to see the Park, Virginia Water, and the Castle.

The municipal borough of Windsor is divided into two wards, and governed by six aldermen (of whom one is mayor) and eighteen councillors. The parliamentary borough, which is co-extensive with the municipal, returned two members to the House of Commons until 1867, when it was deprived of one, the population in 1861 having been only 9520. In 1866 the number of inhabitants had declined to 9482.

The castle is surrounded on two sides by the Little Park, which comprises about 13 acres. In the reign of Queen Anne that part of Windsor Forest which remained the property of the crown, under the name of the Great Park, was cut off from the castle by the intervening private property; and it was therefore determined to buy as much land as might be required to complete an avenue from the royal residence to the forest. This is the present Long Walk, which is a perfectly straight line, above 3 miles in length, running from the principal entrance to the castle to the top of a commanding eminence in the Great Park, called Snow Hill. On each side of the road, which has a gentle rise, flourishes a double row of stately elms, now in their maturity, and the avenue is therefore one of the most magnificent in the kingdom. In 1832 a colossal equestrian statue of George III. was erected at the top of the Long Walk. At the southern extremity of the Great Park lies Virginia Water, the largest artificial lake in the kingdom. It is very picturesquely situated, being hemmed in by thriving plantations.

Windsor Castle, after having been rebuilt by Henry I., was enlarged by Henry III.; but it was not till the fourteenth century that the plan of the whole began to assume its present extent and arrangement, when Edward III. first erected the buildings forming the Upper Ward, east of the Keep. The same king founded the College or Free Chapel of St. George's, in the Lower Ward. These works were carried on from about 1350 to 1374, and were chiefly conducted by William of Wykeham. From this period comparatively little was done until a century afterwards, when Edward IV. began to re-erect St. George's Chapel. Henry VII. made some additions to the castle, and Queen Elizabeth caused the terrace to be formed, thereby giving to the royal abode of Windsor what is not the least striking or least attractive of its characteristics. Under the Stuarts nothing material was done until the Restoration, when the edifice began to be modernized in a tasteless manner. The principal addition made by Charles II. was the Star-building, containing the state apartments. George III. restored the interior of St. George's Chapel (1787–90), which was done in a very judicious way, by scrupulously following the original details. In 1796 James Wyatt was first employed at Windsor, and gothicized the Star-building and the corresponding portion on the north side of the inner quadrangle as far as St. George's Hall. George IV. having announced his intention of taking up his abode within the castle, and converting it into a suitable residence for himself and his successors, a grant of 300,000*l.* was voted by Parliament, in April, 1824, for the projected improvements, and four architects were called upon to furnish designs for the intended works—Soane, Nash, Smirke, and Jeffrey Wyatt. Wyatt's plans were approved of, and no time was lost in carrying them into execution, the first stone of King George IV.'s gateway having been laid by the king himself, August 12, 1824; on which occasion the architect received the royal authority for altering his name to that of Wyatville; and on the king's taking possession of the private apartments, which were completed by the end of 1828, he received the further distinction of knighthood. After the first grant of 300,000*l.*, others were successively made, and the total expenditure down to the end of the reign of William IV. amounted to 771,000*l.*, to which 100,000*l.* more has since been added. As thus restored and enlarged, this magnificent structure covers 12 acres, and contains most valuable collections of paintings and articles of vertu. It consists of three wards, called the Upper, Lower, and Middle Wards, the last being the great machicolated keep, 100 feet in diameter, that crowns the whole pile, and from the top of which there is a magnificent view. The Upper Ward, or principal quadrangle, includes the royal state and private apartments, a Norman gate, and a tower called after William of Wykeham, the architect of the earlier building. It is one of the several towers of different epochs, still existing, and incorporated with the modern structure. St. George's Hall, or Banqueting room, is 180 feet long. In the Audience room are West's historical paintings; and the Vandyke room contains a series of portraits by the great artist from whom it is named. The terrace is around the exterior of this quadrangle, and is 1870 feet long. In the Lower Ward stand the cloisters, the deanery, residences for the canons, and naval and military knights of Windsor, and St. George's Collegiate Chapel, before described.

The Home Park, of 500 acres—an ancient and beautiful domain, surrounding the castle on two sides—contains the Royal Gardens, and Frogmore, formerly the residence of the late duchess of Kent, but now of H.R.H. the prince of Wales. Here, also, stands the magnificent mausoleum erected by her Majesty for the reception of the remains of the late prince consort. The Great Park comprises about 10,000 acres, well stocked with deer; and Windsor Forest, to the W. of it, is 56 miles in circumference. The former contains the Model farm; the Cumberland pillar; the King's (*i.e.*, William the Conqueror's) oak, 26 feet round; Queen Victoria's oak, and other famous trees. Herne's oak, in Windsor forest, so celebrated in connection with Shakespeare's 'Merry Wives of Windsor,' was blown down in 1863; and a memorial stone and young tree mark the spot.

WINE (*vin*, French; *wein*, German; *win*, Anglo-Saxon; *wyn*, Dutch; *vino*, Spanish and Italian; *vinum*, Latin; Οινος, Greek) signifies the fermented juice of the grape only, when an uncompounded word; but when compounded it is applied as a general term to the fermented product of other fruits, in conjunction with the name of those fruits, roots, flowers, or similar substances from which it is made, as gooseberry-wine, ginger-wine, parsnip-wine, cowslip-wine, and all the varieties denominated domestic wines. The juice of the grape (*must*) ferments spontaneously at 70°: the probability therefore is that wine was very early known, particularly in hot climates, where drink is so much required to allay thirst.

Wine is the oldest known fermented liquor, its invention being ascribed to Noah in the traditions of the Jews, almost immediately after the deluge. The writings of Moses show that the kings of Egypt drank wine, as all who have perused them will not fail to recollect in reading the story of Joseph and the chief butler of Pharaoh. The ruined temples of Thebes also display the emblems of the vintage in bas-relief, and figures of men pressing

grapes with their hands, the *must* flowing into goblets emblematic of the wine-press.

The principal component of the juice of ripe grapes is water, in which are various substances, either held in solution or very minutely divided. The juice as obtained by pressure is more or less thick, and rapidly changes into a fermented liquid. Fermentation is excited by the access of air, alcohol and carbonic acid gas being formed by the decomposition of the sugar contained in the fluid.

$$\underbrace{C_{24}H_{28}O_{28}}_{\text{Sugar.}} + \underbrace{4C_4H_6O_2}_{\text{Alcohol.}} + \underbrace{8CO_2}_{\text{Carbonic Acid.}} \; 4HO$$

The process once commenced continues, independently of any further influence. In addition to the alcohol and carbonic acid gas formed by the fermentation, there is also produced a yellow or gray insoluble substance, containing a large quantity of nitrogen. This body possesses the power of inducing fermentation in a new solution of sugar, and has in consequence received the name of *ferment*. The alcohol and carbonic acid gas are produced from the elements of the sugar; but the ferment is formed from those azotized constituents of the grape-juice, which have collectively been termed *gluten*. Gluten dissolved in pure water undergoes a process of decomposition, but the decomposition which it suffers in an isolated state, and that which it undergoes when dissolved in a vegetable juice, belong to two different kinds of transformations. Gluten imparts that impetus to sugar which enables it to alter its condition. When both gluten and sugar are present in a liquid, fermentation will go on until the decomposition of one or other be complete. Wine of the grape is divided into dry and sweet, and every variety is included under one or other of these divisions. When the quantity of ferment is too small in proportion to that of the sugar, the process will be completed before the transformation of all the sugar is effected. Some sugar here remains undecomposed, as the cause of its transformation is absent, namely, contact with a body in a state of decomposition: this condition constitutes the *vins de liqueurs*, the fruity or sweet wines. But when the quantity of ferment predominates, a certain portion of it remains after all the sugar has fermented, and forms dry wines. This residue is still able to induce fermentation when introduced into a fresh solution of sugar, and retains the same power until exhausted. Hence a certain quantity of yeast or ferment is necessary in order to effect the transformation of a certain portion of sugar, fermentation depending solely on its presence, until the last atom of sugar is decomposed.

Climate and soil greatly modify wine both in kind and quality. Differences, however, in the vintage and manufacture also affect the character of wines made in the same district, and cause them to differ widely from each other. These differences sometimes occur spontaneously, as in the case of Amontillado.

The odoriferous principle or *bouquet* of wines is due to peculiar ethers. The conditions of the formation and of the decomposition of these are not perfectly understood at present; some, however, are capable of being formed artificially.

The wine-producing countries in the northern hemisphere are included between 55° N. and the equator, but those in S. latitudes practically do not extend beyond 40°. The extent of the vineyards that produce the finer wines is very limited. The best wines are grown on a soil which is calcareous or composed of disintegrated rock or loose gravel. [VITIS.]

In the English colonies and in the United States of America, not long ago covered with primeval forests, the soil enriched by the autumnal spoils of ages is too rich for the vine, the fruit of which, for making good wine, differs so much from the character of fruit in general when intended for the table. By a remarkable peculiarity, nature, and habit of the vine, it adapts itself to those parts of a country which are least fitted for the cultivation of cereals. Those vines which bear the best fruit for the choicest dry wines, invariably grow on soils which would be unproductive with respect to food crops.

Dry and sweet or *liqueur* wines, then, are distinguished principally by the exhaustion of the saccharine in the dry; and in the sweet, by its not being all converted into alcohol, the glucose surpassing the gluten in proportion, the change is in consequence only partially effected. Another wine of a very distinct character is procured by suppressing the fermentation; in other words, by retaining the carbonic acid gas to a considerable extent. This species comprehends the wines of Champagne, Burgundies, Moselles, Hocks, and other light bodied wines, all managed in the same mode. Champagne wines are distinguished as still, creamy, and sparkling, or *mousseaux*, *crémans*, and *non-mousseaux*, of which the two last are most in esteem. These wines are produced principally on the banks of the Marne, and constitute a unique class. The choicest are made from the best varieties of white or black grapes, gathered with care, and the sound fruit only is used. The grapes are carried to the press in baskets, covered up from the sun, and placed on the press with as little motion as possible. The must is poured into vats for a term of from six to fifteen hours, that the dregs may be deposited. As soon as the fermentation appears the wine is transferred to hogsheads of about 44 gallons each. At Rheims, the great emporium of this manufacture, tuns holding twelve thousand litres were a few years ago introduced by a German house, and the advantage of their use became unquestionable.

The operation of bottling takes place in April and continues till June. The liquid in the hogsheads is of an uniform amber colour. The bottles, which are those from which the wine is to be drunk when finally prepared for drinking, are filled to within an inch of the lip and corked, the corks being fastened down with a narrow piece of iron called an *agrafe*, bent into a hook at each end. This catches under the rim which surrounds the mouth of the bottle, and can be rapidly applied or removed, and re-used indefinitely; the bottles are never changed, but the corks are on each operation. The bottles thus filled and corked are laid in horizontal lines supported by laths, extending many hundred feet in length, from 10 to 12 feet wide. If the wine has been properly made fermentation goes on vigorously for about three weeks, a period of anxiety to the manufacturer, on account of the breakage, which is sometimes enormous; the average, however, is 10 per cent. The wine is carefully nursed and shifted for two, three, or four years, until ready for the final transformation; ordinary wine is seldom kept beyond two years, the choicer sorts for a much longer time; the vintage of 1858 is only now in perfection.

The next stage in the preparation is to remove the sediment. The bottles being placed carefully on their sides and left in perfect repose, the sediment in a short time is deposited on the lower side of the bottle, the wine appearing above the deposit pure and limpid. The bottles are then placed in a diagonal position upon racks, the happy invention of Mad. Clicquot. Holes are

pierced in the sides of these, and the necks of the bottles being thrust through are maintained at an angle of about 45°, the raised bottoms projecting outwards. After being so arranged within convenient reach of the workman, he daily, for six weeks or so, takes hold of each by the bottom, giving it a half rotary motion, and slightly changes its position. The sediment is thus finally shaken down into the neck of the bottle and rests on the cork, the bottle being ready for the next process, the disgorging of the sediment. The *degorgeur* places himself close by the bottles with his apparatus, consisting simply of a basin opening into a reservoir below, and supported by a wooden frame covered by a hood. The workman's only implement is a hooked and sharp-pointed steel (*crochet*), with a single touch of which, standing before the basin and holding the bottles diagonally with the neck downwards, he disengages the *agrafe*. The cork impelled by the gas is driven out, followed by the sediment clinging to it, and also by the frothy wine. The flow of the latter, however, is at once checked by the finger of the operator, who gives the bottle some quick half turns, so that the wine allowed to escape may effectually rinse out the neck; a few instants complete the operation, with the loss of not more than a couple of spoonfuls of wine. The hood intercepts the flying cork, wine, and sediment, which latter are allowed to escape; the cork and *agrafe* are retained for future use. To prevent the further escape of gas and wine the *degorgeur* immediately stops the orifice with one of the corks, which, having been already used and compressed, is easily done, and secures it with the *agrafe*. The wine is then dosed, corked, and fastened down with string and wire. The workmen are seated in a row together with their necessary tools, &c., within reach. The bottle first passes through the hands of the doser, who uncorks it, and allows what he thinks sufficient of the wine to escape, replacing it to within the proper distance from the mouth with a fluid from a tin measure, and which flowing smooth and amber-coloured from its nozzle looks like the purest spermaceti oil. This liquid is the *liqueur*, an indispensable constituent of all wine known as champagne. It consists of a saturated solution of sugar candy in white wine of the best *Cuvées*, with a small portion, about 8 per cent., of the finest Cognac. The quantity of this syrup used depends upon the original character of the wine and the degree of sweetness intended to be given. The Russians demand a wine sweet and strong; the English a very dry but vigorous champagne; while the French and other continental consumers prefer a light sweet wine. Dry champagne, to be good, must be made of the finest raw wine, every natural feature of which is discernible; but sweet champagne can be made of almost any materials, as the sugar masks its original character. If colour is required it is usually added with the liqueur. Madeira wine, Kirsch, tinctures of various kinds, &c., have been sometimes added.

Ordinary champagne contains about from 30 to 40 per cent. of *liqueur*, or syrup, the fine dry wines seldom more than from 10 to 15 per cent. As soon as the *liqueur* has been added the bottle is passed on to the corker, who is seated before a machine for compressing and driving in the cork. The corking being completed the bottles are next passed to the man whose business is to apply the string, which he does with great rapidity and force. The cord is very strong, and as it is applied with all his strength, it brings down the edges of the cork, till the top becomes round as we see it in the champagne bottles at table. It is then passed on, after giving it two or three rapid turns, to the next in order beside him, whose business it is to attach the wire, and who also gives it two or three turns before placing it down, as does every one else who has occasion to touch the bottles, for the purpose of mixing the *liqueur* and wine well together. After the lapse of about a fortnight the bottles are removed to the packing-room, where the necks are covered with wax or tinfoil, and the sides adorned with the *etiquette* or label of the house, after which they are carefully packed in cases or baskets, and are ready for shipment.

According to the latest reliable statistics the aggregate annual production of champagne has reached upwards of 52,000,000 gallons.

The finest red wines in the world are those of Burgundy, in the district of Côte d'Or, and are produced chiefly from the grape called Pineau. The finer wines are all produced in the districts of Nuits and Vosne; of these the Romanéeconti and the Chambertin are among the more celebrated. The white wines of the same district are not so well esteemed as the red. The exception is the Mont Rachet wine, a celebrated growth, made near Beaune, which presents one of those extraordinary phenomena in wine which no scientific investigation has succeeded in explaining. Three kinds of wine are made of fruit grown on the same land, so contiguous as only to be separated by a footpath, having the same exposure, the soil, as well as the species of vine, apparently the same; yet the last brings only one-third the price of the first.

The delicate and lighter red wines, the produce of the Gironde, in England generally designated by the term claret, successfully dispute the palm of merit with the Burgundies. Of these, Lafitte, Latour, Chateaux Margaux, and Haut-Brion are so deservedly esteemed that they always sell at from 20 to 30 per cent. higher than any others of the department. The first mentioned is the most delicate, and is characterized by its softness on the palate, and its charming perfume, which partakes of that of the violet and the raspberry. The Latour has a fuller body, and at the same time a considerable aroma, but is wanting in the softness of the Lafitte. The Chateaux Margaux, on the other hand, is lighter and possesses all the qualities of the Lafitte, except that its flavour is not quite so high. The Haut-Brion has more spirit and body than any of the others, but is rough when new, and requires to be kept for six or seven years in the wood, while the preceding wines become fit for bottling in much less time. It is estimated that the present production of wine in France exceeds a thousand million gallons annually.

Italy, whose climate is so congenial to the vine, with the exception of the Montepulciano and the *Lacrymæ Christi*, produces but few wines of export much valued, owing to the ill management of the vintage. No attention is paid to the assortment of the grapes, ripe and unripe being thrown into the vat together.

The Grecian Archipelago produces many wines of note, which are daily growing into repute on their becoming better known. In Cyprus the grapes are not suffered to lie too numerously on the stock; they are of a rich purple, with a thin skin. The vintage begins at the end of August, or the commencement of September. For the celebrated wine of the Commandery, the fruit is placed on covered floors and spread out with care in a bed of 18 inches thick, where the grapes remain until the seeds are ready to drop from them. They are then carefully lifted with wooden shovels and carried to rooms

paved with marble, or covered with cement equally compact. The grapes are bruised with a wooden mallet and pressed, the must, which is very thick, flowing into a vessel on the lower side of the floor; when full the vessel is emptied into small vases, and in these conveyed into baked earthen vessels with acute bases, like the ancient amphoræ. In these the wine is left forty days to ferment, in some places with the vat covered while in that state. The art of making these vessels belongs to the remotest antiquity. They hold from twenty to thirty barrels, and in them the lees are deposited. When removed, leathern bags are adopted, pitched on the inside, and of course detrimental to the wine, which does not for many years lose the disagreeable flavour. This famous wine, of which about 10,000 jars are now annually produced, was named from the commander of the Knights Templars, to whom the district once belonged. When poured into a glass, if good in quality, the particles adhere like oil to the sides.

The wine of Portugal, called Port wine, from Oporto, its usual port of shipment, forced upon the people of England in 1703 by having been assessed with a duty one-third less than that produced in other countries, drove out many fine wines, of which there was a great variety before, and forced an inferior article upon the public, under the mistaken idea that Portugal would take English woollens in return. The effect was to drive all these wines out of the country. At first the wine came in its natural state, but was afterwards sophisticated and brandied, although in the opinion of many analysts there is no more necessity to add brandy to port than sulphuric acid to vinegar. Pure wine was not allowed to be exported, although good and enduring, until the laws of Portugal in 1865 recognized free trade in the article, previously to which it was necessary to add a large per centage of brandy to meet legislative requirements.

Madeira was long famous for its fine white wine, but the almost total destruction of the vines by the *oïdium*, or grape disease, temporarily stopped the trade; it is now, however, beginning to recover.* The vines were planted in a volcanic soil, a mixture of red and yellow tufa, with a light clayey earth and volcanic cinders intermingled. A voyage to the East or West Indies is thought preferable for ripening the wine; but formerly this was effected by plunging the bottles, when corked, into a trench of fermenting horse-dung, and by this means in a few months the wine attained maturity.

The wines of Spain are quite distinct from those of Portugal and France, but, with the exception of those made in Andalusia, in which a large amount of British capital is invested, they were until recently carelessly manufactured. That description called sherry is made near the town of Xeres de la Frontera, 9 miles from Port St. Mary's, across the harbour of Cadiz. The highest class of sherries are those which are technically called *dry*, and include Amontillado, Manzanilla, Montilla, and Vino de Pasto. That kind denominated Amontillado is a drier wine than the common sherry, and is often the result of accident. Of a hundred butts from the same vineyard some will be Amontillado, without it being possible to discover the cause. When it is made the grapes are plucked a week or two before those for the other wine, but the treatment is precisely the same. Another species which may be classed under the same denomination is that called Manzanilla, light, delicate, and straw-coloured. The wines of Malaga are of ancient date, and the vines are grown near sugar canes, the only spot in Europe where the latter are found. The bastardo grape makes the sweet wine, the *must* being conveyed from the press in a half-fermented condition to the merchant's stores. The dry wines of Xeres and Malaga, as well as those of Teneriffe, were formerly called *sacks*. The wines of Spain have the ascendancy in England, on account of an alleged greater freedom from acidity, due possibly to the practice of sprinkling powdered gypsum over the grapes before being trodden. Owing to the variable climate of this country it is considered necessary before shipment to add adventitious spirit to these wines.

The natural colour of pure sherry is pale or amber, but becomes darker with age; it has a fine aromatic odour, and its taste is warm, with some degree of the agreeable bitterness of the peach kernel. When new it is harsh and fiery; it is mellowed by remaining four or five years in the cask, but it does not attain its full flavour and perfection until it has been kept for twelve or fifteen years.

The province of Valencia produces a great variety of wines. Large quantities of a strong, sweet, red wine, called Benicarlo, from the port whence it is shipped, is exported to Cette; it is thence conveyed by the canal of Languedoc to Bordeaux, where it is mixed with the poorer sorts of the wines of the Gironde, to which it gives colour, body and durability.

Rhine wines deserve special consideration, on account of the great skill and industry displayed in their production, and the high state of perfection to which the Germans have brought their vineyards. The finest possible wines produced are in all probability the Johannesberger and the Steinberger. Both these wines are endued with freshness, aroma, and flavour in the highest degree, and there is in all likelihood no wine in the world which possesses more purely exhilarating properties than these. The best of the Rhine wines are all white. There is one red species called Assmannshausen, of which only small quantities are produced, but the wine is of rare merit. The true characteristics which distinguish the good wines of the Rhine are, however, to be found in no others. The bouquet is as distinctive as the scent of mignonette, or any other particular flower possessing a compound odour. The flavour is equally remarkable, added to which there is a *raciness* which conveys a quickening relish to the palate and appetite. The endurance of these wines is astonishing; some of them known to have been made in the year 1616, are still perfectly sound after a lapse of two centuries and a half. About 45,000,000 of gallons are annually produced in the Zollverein.

The Austrian empire produces some unique and very excellent wines, prominent amongst them being those of Vöslau, situated southward of Vienna, between the Hungarian mountains and the slopes of the Styrian Alps. The Vöslau wines are widely different from other Austrian and Hungarian growths, being distinguished by their superior smoothness and fulness of body, and resemble the finer class of the so-called Burgundy clarets. Of Hungarian wines, the annual produce is estimated at 360,000,000 gallons. The names of the principal sorts of the white wines are Somlau, Neszméły, Oedenburg, Ruszter, Bakator, and Tokay; of the best red wines, Erlau, Ofen, Ménes, Carlowitz, Szeg-

* Various conjectures have been put forward as to the nature of *oïdium*. Some have ascribed it to a microscopic insect; others to the deposit of a fungus; and others have sought to attribute it simply to the action of ordinary variations of moisture and temperature. Like the malady which for several successive seasons almost annihilated the potato-crop, this strange disorder is obscure in its nature, its origin, and its treatment.

száre. Finest of all these wines is Tokay, so called from a town near the place of its production, on the Theiss, about 45 miles N.N.W. from Debreczin, and which consists of three varieties—viz., the Essence, flowing spontaneously from the ripest grapes; the Ausbruch, obtained by pressing the overripe grapes, a small quantity of good new wine or *must* being at the same time added in varying proportions to fresh *must*; and the Maslas, or inferior variety, produced by pouring a larger quantity of less choice *must* over the berries, and subjecting them to the action of the press. Of these varieties, the first, which is made only in very small quantities, is in the highest degree sweet and luscious, and is more sought for as a rarity than as being pleasant to the palate. Genuine Tokay is scarce, and of enormous price, and but little ever finds its way to England. Until the last few years, on the occasion of the reduction and assimilation of the customs duties on wine, neither Austrian nor Hungarian products were much known to the English public, but a taste for them is daily increasing. Next to France, the most extensive wine-producing country is Hungary. Of its fifty-two counties there are not more than six or seven that do not produce wine; and the annual yield is calculated to exceed 360,000,000 gallons. These wines have recently acquired a high reputation for hygienic properties, on account of the phosphates contained in them. It is therefore very probable that in the course of time, with a moderate tariff of prices, some of them may compete with claret, hock, and champagne, the more successfully if, as alleged, their purity is unquestionable.

WINE TRADE. The wine trade of England has been governed for a century and a half almost wholly by a particular treaty with Portugal, called the Methuen treaty, chiefly by creating an artificial taste for that particular wine which happened to be most easily procured. During many centuries almost the only foreign wines consumed in England were French. In 1693 a change began, by favouring Portugal wines with a lower import duty; the favour was increased in 1697; and in 1703 Mr. Methuen negotiated a treaty, whereby England engaged to admit port wine at a duty of one-third less than that on French wine, on condition that Portugal received English manufactured goods on favourable terms. The effect was at once apparent, and has been from that day to this. During the greater part of the last century England took twenty times as much Portuguese wine as French wine, until the taste for the latter became almost extinguished, except among the wealthy classes. The wine-growers on the Douro, and the great merchants at Oporto, finding they had nearly a monopoly, worked it to their own profit. An Oporto wine company, established in 1754, purposely diminished the extent of the vineyards, with a view of keeping the price wholly under their own command; and this policy was successful until quite recent times. Almost every gallon of port wine was sent to England; other countries either did not like it, or would not pay the price demanded for it. The natural flavour and quality of the wines of the Upper Douro are almost unknown in England, and probably would not be relished; they are strongly flavoured for the English market, and require to be kept many years in the wood and in bottle before they acquire the qualities familiar to English port-drinkers.

In 1819 a reduction was made in the duty on French wines; and in 1831 the duty on all foreign wines was equalized, after 128 years of favouritism to Portugal. The consumption of port did not, however, yield to the change, because the English had become accustomed to the taste of that wine, and had not yet learned to appreciate the light wines of France. So signally was this the case, that in 1842, eleven years after the equalizing of the duty, the English consumption of French wines barely amounted to one gallon for every sixty persons: the total consumption of all wines was about a quarter of a gallon per head, whereas, so far back as the year 1700, it was a gallon per head.

From 1697 to 1785 the quantity of foreign wine imported annually never varied far from 2,000,000 to 3,000,000 gallons; from 1786 to 1851 it varied from 4,000,000 to 11,000,000 gallons. The Portuguese wine (port) maintained an ascendancy over Spanish (sherry) till about 1830, after which year the latter advanced until in the year 1867 the imports became nearly twice as large as those from Portugal.

In 1861 a remarkable advance took place in the importation of French wines, the quantity for that year being nearly double that of previous years. This resulted from only a few months' operation of the new tariff, which opened the way for the introduction of French wines at a moderate duty. By the Customs Duties Act, passed August 28, 1860, foreign wines during the remainder of that year were to pay 3*s.* per gallon, and colonial wines, 2*s.* 9*d.*, plus 5 per cent. A new Act took effect January 1, 1861, by which all wines were admitted at a duty of 1*s.* per gallon if containing less than 18 per cent. proof spirit; the duty rising to 2*s.* 11*d.*, according to the alcoholic strength. From the 4th of April, 1862, the duty on wine has been rated at 1*s.* per gallon when under twenty-six degrees of spirit proof; 2*s.* 6*d.* when over twenty-six and under forty-two degrees; and 3*d.* per gallon for each degree beyond this, as ascertained by Sykes' hydrometer.

The following table furnishes the statistics of wine imported; entered for duty, value, price, and amount of duty for the year 1866:—

IMPORTS—RED.

	Total.	Entered for Home Consumption.	Value of Total Imported.	Price per Gallon.	Customs Duty.
From—	Gallons.	Gallons.	£	*s.* *d.*	£
France, . .	2,619,963	2,408,008	968,342	7 5	146,138
Portugal, . .	3,513,744	2,976,817	939,079	5 4	371,980
Spain, . . .	968,711	603,882	107,020	2 2½	74,578
Other countries, . .	188,261	207,795	16,643	1 9	16,611
Total, .	7,290,679	6,196,502	2,031,084		609,346

WHITE.

Hamburg, .	307,423	227,985	29,624	1 11½	27,105
Holland, . .	441,974	433,072	214,779	9 9	30,961
France, . .	1,048,879	958,065	487,718	9 4	47,533
Spain, . . .	5,501,646	4,908,243	1,852,655	6 9	610,131
Sicily, . . .	450,386	393,758	70,751	3 2	49,126
Other countries, . .	280,042	209,304	46,864	3 3	23,132
Total, .	8,030,350	7,130,427	2,702,391		807,038
Total of all kinds, . .	15,321,029	13,326,929	4,733,475		1,416,944

In the same year the quantity of foreign wine exported from the United Kingdom amounted to 2,191,023 gallons, value 687,571*l.* The following were the countries to which upwards of 100,000 gallons were sent:—France, 147,461; Bombay, 112,565; Bengal, 155,268; British North America, 152,097; West Indies, 153,280; and Australia, 543,184.

By the Refreshment Houses and Wine Licenses Act of 1860, any shopkeeper may take out a license, varying from 10*s.* 6*d.* to 3*l.* 3*s.* per annum, according to the rated value of his house, for the sale by retail of foreign wine. The word retail is considered to refer to quantities less than two gallons, or one dozen bottles. The wine may be drunk on the premises under certain specified conditions, and on payment of a higher license duty. All liquor sold as wine at these places must contain less than 40 per cent. of proof spirit or it will be regarded as spirit. Excise officers possess considerable powers in respect of the examination at all times of premises licensed as wine shops. The description and statistics of SPIRITS are given in the articles BRANDY, GENEVA, and RUM.

WING. [BIRDS.]

WINNIPEG, LAKE, in British North America, is between 50° 30′ and 54′ N. lat., and 96° and 99° W. long. It is 850 feet above the sea, and is of very irregular shape, particularly in the S. The length from N.W. to S.S.E. is 305 miles; the breadth varies from 5 to 70 miles. The waters are muddy, and the shores are low; the S. banks being well wooded, while those on the N. are composed of naked rock. The lake receives the Saskatchewan and the Red River; and discharges its surplus water through the Nelson, by a chain of smaller lakes, into the Hudson Sea.

WINSLOW. [BUCKINGHAMSHIRE.]

WINSTER. [DERBYSHIRE.]

WINTER (from a Teutonic word), the fourth season of the year. The Earth is at this period nearest to the sun, but owing to the obliquity of the solar rays and the extreme length of the nights, its temperature is lower than at any other time. Among the positions which our planet occupies in its annual revolution round the great luminary of day, there are four principal ones, diametrically opposed, in pairs, which influence in a most important manner the relative duration of day and night, and the seasons; these are the two equinoxes and the two solstices. The order and dates of their succession are as follow:—

Towards the 21st of March, the Earth is at the first of these points, called the Spring Equinox; then, about the 21st of June, comes the Summer Solstice; the Autumnal Equinox, near the 22nd of September; and lastly, on the 21st of December, the Winter Solstice.

Winter, therefore, may be considered to begin on the 21st of December, and to terminate on the 20th or 21st of March. The precise epoch of each position, however, varies slightly every year, as may be seen by a comparison of 1867 and 1868.

	In 1867.	1868.
Spring began	Mar. 21, 8.55 a.m.	Mar. 20, 7.18 a.m.
Summer "	June 21, 3.33 a.m.	June 21, 3.44 a.m.
Autumn "	Sept. 23, 6.13 p.m.	Sept. 22, 6.7 p.m.
Winter "	Dec. 22, 3.42 p.m.	Dec. 21, 0.3 p.m.

WINTERA'CEÆ, a natural order of plants belonging to the albuminous group of polypetalous Exogens. It contains four genera, *Illicium*, *Temus*, *Drymis*, and *Tasmania*.

The following are the principal species:—*Illicium Floridanum*, the Florida Anise-seed Tree. *Illicium anisatum*, the Chinese Anise-seed Tree. *Temus moschata*, a shrub found in Chili. *Drimys Winteri*, Winter's Bark, a tree, a native of the Straits of Magalhaens. The bark, which is met with in English commerce, is in quills about 1 foot in length and from 1 to 2 inches in diameter, It is an excellent aromatic, but can seldom be met with in druggists' shops. *Drimys Granatensis*, New Granada Winter's Bark, a tree about 20 feet high, grows on the mountains of New Granada and Brazil. *Tasmania aromatica* belongs to Australia and Van Diemen's Land.

WINTZENHEIM. [RHIN, HAUT.]

WIRE is metal elongated into the form of a slender rod, generally cylindrical, but not necessarily so. In early times, metals were probably beaten out with a hammer into thin plates or leaves, which were then divided into small slips by means of scissors or some other cutting instrument, these slips being subsequently rounded by a hammer and a file, so as to form threads or wires. So long as wire was formed by the hammer, the artists of Nürnberg, by whom it was fabricated, were styled 'wire smiths,' but subsequent to the introduction of the drawing process their designation was changed to 'wire-drawers.' Beckmann conceives that the invention of wire-drawing must be assigned to the fourteenth century. Previous to 1565 all English iron wire appears to have been drawn by manual strength. The first wire-mill in England was set up at Sheen, now Richmond, by a Dutchman, in 1662.

For the manufacture of iron wire the very best and toughest iron is selected. Before the process of rolling with grooved rollers had become common, the iron was prepared for use by a slow and tedious process. At the present day the preparing of iron for the wire-drawers is performed by means of rollers, which are generally 7 or 8 inches in diameter, and are sometimes made to perform 350 revolutions in a minute. A bar of steel 30 inches long and an inch square, heated to redness, is passed between the rollers, through grooves successively diminishing in size, eight times in less than a minute, and is thereby elongated to from 20 to 30 feet. For ordinary wire the rods are commonly reduced to a thickness of about one-eighth of an inch by this process; and these rods themselves are used as wire for some purposes. The kind of cast-steel wire of which the best needles and some other articles are made, is not usually submitted to the rolling process; but, after being tilted to about a quarter of an inch square, it is rounded on an anvil previous to elongation by the draw-plate.

The drawing of wire is thus managed. The draw-plate is usually formed of a stout piece of shear-steel, about 6 inches long and 1½ inch in diameter, but being somewhat reduced in thickness towards each end, like a cucumber, and flattened on one side. It is pierced transversely with several conical holes, the larger orifices of which open upon the flattened surface of the plate, while their smaller orifices are carefully finished to the size to which it is intended to reduce the wire drawn through them. In drawing wire by hand the draw-plate is laid against two upright pillars fixed on a bench or table, and the extreme end of the wire to be drawn being so reduced as to enable it readily to pass through the hole, a small portion is drawn through by a lever apparatus, and attached to a cylindrical drum, mounted on a vertical axis. The workman then takes in one hand the coil of thick wire to be reduced, and in the other a lever handle attached to the drum; and while he turns the latter so as to wind the wire upon its circumference, and consequently to draw it through the plate, he imparts a kind of twist to the wire which enters the plate, by a peculiar motion of the hand in which the coil is supported.

The size of wire is commonly measured by means of a gauge consisting of a plate of steel with a series of deep notches or slits at each edge, varying slightly from each other in width, and numbered according to the

number given to wire of corresponding size. The exports of wire from the United Kingdom, in 1866, were 20,477 tons, value 400,425*l.*, and of wire manufactures 2056 tons, value 62,911*l.* In the same year 45,315 cwts, value 52,109*l.*, were imported.

WIRE-WORM. [ELATERIDÆ.]

WIRKSWORTH. [DERBYSHIRE.]

WIRTEMBERG. [WÜRTEMBERG.]

WISBEACH. [CAMBRIDGESHIRE.]

WISCONSIN, one of the United States of North America, is situated between 42° 30′ and 46° 55′ N. lat. and 86° 40′ and 92° 50′ W. long. It is bounded S. by Illinois, E. by Lake Michigan, W. by the Mississippi, and N. by Lake Superior. The area is 53,924 square miles, or 34,511,360 acres, of which only 3,746,167 were cleared in 1860.

Physical Aspect.—The surface of Wisconsin is very varied, but may be described generally as an elevated rolling prairie, from 600 to 1200 feet above the level of the sea. The highest portion of this plateau is on the N., and forms the dividing ridge between the waters flowing S.W. into the Mississippi, and those running N. into Lake Superior. The southern slope is again interrupted about the middle of the state by another ridge, giving origin to a second slope, drained by Rock River and its branches. There are no mountains, properly so called. The descent towards Lake Superior is very abrupt, and the rivers are full of rapids and falls, which interrupt navigation. There is a third ridge or elevation in the S.E., dividing the water-courses of Lake Michigan from those of Green Bay.

Limestone underlies most of the southern part of the state—the cliff limestone in the mineral districts, and the blue elsewhere. The northern district seems to be composed of primitive rocks, mostly granite, slate, and sandstone. Part of the great lead region, extending from Illinois and Iowa, is included in the S.W. of Wisconsin, and is no less rich in the quantity and quality of its ore than in the other states, besides being intermingled with copper, zinc, and silver; iron also abounds in many places. Marble of a fine quality, some gypsum, saltpetre, and other minerals, have been discovered.

Hydrography.—Besides the great lakes Superior and Michigan, Wisconsin has a number of smaller ones. The principal of these is Lake Winnebago, S.E. of the middle of the state. It is about 28 miles long and 10 miles wide, and communicates with Green Bay (a N.W. arm of Lake Michigan), through the Fox or Neenah River. The lakes are most abundant in the N.W. and are generally characterized by clear water and gravelly bottoms, often with bold picturesque shores, crowned with hemlock, spruce, and other trees. They afford excellent fish. The rivers which traverse the interior flow generally in a S.W. direction, and discharge their waters into the Mississippi, which runs along the S.W. border for more than 200 miles. The most important river in the state is the Wisconsin, which has a course of 200 miles, almost directly S., when it flows nearly W. for about 100 more. It is navigable for steamboats 180 miles. [MISSISSIPPI.] The Chippewa is about 200, and the Black River 150 miles long. The Rock, Des Plaines, and Fox River (of Illinois) drain the S.E. slope of the state, and pass off into Illinois. The St. Louis (considered as the primary source of the St. Lawrence), runs along the state for 20 or 30 miles on the N.W., and is full of rapids and falls in this part of its course.

Climate, Soil, &c.—The climate, though severe, and the winters long, is regular, and free from the frequent and unhealthy changes that prevail farther south. The lakes exert a mitigating influence, the temperature being 6½° higher on the lake than on the Mississippi side. The lake shore is also more moist, but Wisconsin generally is drier than in the same parallels farther east. The soil is well watered, and usually fertile.

The country south of the middle of the state is a fine agricultural region. In the mineral district it is broken, but, what is unusual in mining tracts, generally well adapted to farming, and especially grazing. The agricultural capabilities of the northern part of the state, around the head waters of the Black and Chippewa rivers, and the sources of the streams emptying into Lake Superior, are small, the surface being covered with drift and boulders, or ponds and marshes. Large quantities of wheat (the state being the second in the Union for this crop), maize, rye, oats, barley, potatoes, tobacco, maple sugar, hemp, flax, hops, &c., are produced, and there are numerous flocks of sheep and herds of cattle.

The wild animals are black bears, prairie wolves, gray wolves, foxes, woodchucks, and the gopher, which is found only on the W. side, near the Mississippi River. The last-named animal is very destructive to the roots of fruit trees.

Products and Resources.—Vast forests of pine occur on the Upper Wisconsin, the Wolf River, and the tributaries of the Mississippi, N. of the Wisconsin. The other forest trees are spruce, tamarac, cedar, oak of different species, birch, aspen, basswood, hickory, elm, ash, hemlock, poplar, sycamore, and sugar maple. The park-like oak openings form a pleasing feature in the landscape.

The manufactures are as yet chiefly confined to articles of most general use, such as agricultural implements. There are, however, some distilleries and breweries, and a few iron foundries. The state has about 1000 miles of railway, and a canal connecting Lake Michigan with the Mississippi, so that it has communication with almost every part of the valley of that river. Wisconsin also enjoys great facilities for internal trade with the lake and eastern states, through those great inland seas which bound it on the N. and E. The chief exports are wheat and other grain; and the imports, manufactured articles.

Ample provision has been made for educational purposes (in grants of land, &c.), and there are numerous schools; besides a university at Madison. The places of worship number over 1100. The largest religious bodies are the Methodists and Roman Catholics. The growth of the state has been exceedingly rapid, the population having increased from 30,945 in 1840, to 305,391 in 1850, and to 775,881 in 1860. The inhabitants consist chiefly of immigrants from Ireland, Germany, and Wales. There are about 1000 aboriginal Indians.

Chief Towns.—Towns are fast springing up in Wisconsin, but at present the population of most of them varies from 2000 to 5000 only. The places of greatest importance are as follows:—*Madison*, the capital of the state, is pleasantly situated on an isthmus between two lakes, 80 miles W. of Milwaukie, and 132 miles N.W. of Chicago, in lat. 43° 5′ N., long. 89° 20′ W. It stands in the centre of a broad valley, surrounded by heights from which the city can be seen at a distance of several miles. Lake Mendota, which lies on the N.W. side of the town, is 6 miles long by 4 miles wide. It is a beautiful sheet of water, with clean gravelly shores. The depth is sufficient for navigation by steamboats, being estimated at about 60 feet. Lake Monona, on

the opposite side, is rather smaller. When Madison was selected for the seat of government, in 1836, it contained no building but a solitary log cabin. The new Capitol is a fine structure, standing 70 feet above the level of the lakes, in the centre of a public park. On College Hill, 1 mile W. of the Capitol, and about 125 feet above the lake, is situated the University of Wisconsin, instituted in 1849. Madison has nine newspapers, a lunatic asylum (opened in 1860), historical society, four banks, twelve churches, two iron foundries, a woollen factory, and several steam mills. Owing to its beautiful situation and healthy position, it is frequented by pleasure-seekers as a place of summer resort. Railroads radiate from it towards the east, west, and south, connecting it with Milwaukie, Chicago, and the Mississippi River. Since its origin it has steadily increased. Population in 1840, 376; in 1850, 1525; in 1860, 6611; and in 1868, about 10,000. Many of the inhabitants are Norwegians. *Janesville*, finely situated on both sides of Rock River, is 45 miles S.E. of Madison, and 65 W.S.W. of Milwaukie, with which it is connected by railroad. It is built principally on a level space about 200 yards in width, between the river and the bluffs, which rise nearly to the height of 100 feet. The town contains nine churches, a court-house, two banks, a high school, a female seminary, and the state institution for the blind. Rock River affords extensive water power, which is employed in factories and mills of various kinds, and Janesville is the centre of an active and increasing trade. It was settled about 1836, and incorporated as a city in 1853. Population in 1860, 7703. *Milwaukie*, a city, port of entry, and the most populous town of the state, is situated on the W. shore of Lake Michigan, at the mouth of Milwaukie River, 90 miles N. of Chicago, and 75 E. of Madison, in lat. 43° 3′ N., long. 87° 57′ W. The largest boats on the lakes can ascend the river 2 miles from its mouth. Considerable sums have been expended on the improvement of the harbour, and it is now one of the best on the whole chain of lakes. The city is pleasantly situated upon each side of the river; its general appearance is peculiar and striking from the delicate cream or straw colour of the bricks with which the houses are built. Large quantities of these bricks are manufactured in the town, and annually shipped to other parts of the Union. Milwaukie contains forty-three churches, several literary institutions, eleven public schools, a female college, several academies, three orphan asylums, and two hospitals. The Catholics have a large convent, called 'Convent Notre Dame.' There are five or six daily and seven weekly newspapers, and eight banks. Six railroads centre in the town, which is the outlet and shipping port for the production of a rich and rapidly improving country, and is one of the largest wheat marts in the world. Oats, barley, butter, eggs, hides, wool, and pork, are also extensively exported. Steamers run across the lake during the whole year, and so admirably is the town supplied with navigable facilities that a large quantity of the wheat exported is now sent to England, through the lakes and the St. Lawrence, without transhipment. Milwaukie is remarkable for its healthy climate, and for the rapidity of its growth. There are six large flour mills, a woollen factory, several machine-shops, an extensive iron rolling mill, and many other industrial establishments. The extensive water power of the Milwaukie River is an important element in the prosperity of the town. It was settled in 1835, and in 1868 the population was about 70,000. *Oshkosh* is situated on both sides of the Fox River, at its entrance into Lake Winnebago, on ground that slopes regularly towards the lake and river, affording good drainage for the whole city. Immediately above the town the river widens out into Lake Butte des Morts. Owing to the proximity of so much water, the heats of summer are much tempered and the nights in particular are always cool and pleasant. Lumber and agricultural machinery are the principal manufactured products. There are about twenty saw mills, and other industrial establishments. By means of the Fox and Wisconsin rivers, the port is connected with Green Bay and the streams that flow into the Gulf of St. Lawrence, on the one hand, and with the Mississippi on the other. Some steamboats are built for navigating these waters. Population about 9000. *Racine*, beautifully situated on the W. shore of Lake Michigan at the mouth of Root River, is 25 miles S. by E. of Milwaukie, and 62 miles N. of Chicago. It is the second place of the state in population and commerce, and has one of the best harbours on the lake, formed by the mouth of the river, which admits vessels drawing 12 feet of water. The town is well laid out in blocks with wide streets, and contains a number of fine public buildings, among which is the college founded by the Episcopal church, sixteen churches, and three banks. There are some shipbuilding yards, several foundries and machine-shops, largely engaged in the manufacture of cars, steam-engines, and boilers (for the Racine and Mississippi Railway, of which the town is the lake terminus) and various agricultural implements; four flour mills, and ten tanneries. There are several superior schools. The Chicago and Milwaukie Railroad passes through the town, which was first settled in 1835, and incorporated in 1848. Population in 1850, 5111; in 1868, about 12,000.

The governor of Wisconsin is elected for two years, and receives 1250 dollars per annum. There is also a lieutenant-governor, elected for a like period, who is ex-officio president of the Senate, and receives five dollars a day during the session of the legislature. The Senate consists of thirty-three members, and the House of Representatives of 100: the former are elected for two, and the latter for one year. Every male who is above twenty-one years of age, and has resided in the state a year, has a vote.

Wisconsin was visited at a very early period by the French missionaries and discoverers, and a settlement was made by the French from Canada in the latter part of the seventeenth century. There was no considerable influx of emigration, however, till quite recently; but it is likely to repay amply for its tardiness, by the unexampled rapidity with which it now flows into the state, invited by its rich soil, valuable minerals, beautiful lakes, and rolling prairies. Wisconsin was formed into a territory in 1836, and admitted into the Union as an independent state in 1848.

WISDOM, BOOKS OF. [ECCLESIASTICUS.]

WISHAW. [LANARKSHIRE.]

WISSEMBOURG. [RHIN, BAS.]

WISTA'RIA, a genus of plants belonging to the natural order *Leguminosæ*, named after Caspar Wistar, professor of anatomy at Pennsylvania. The species are deciduous twining shrubs, natives of North America and China. They grow vigorously in Great Britain, and form when in flower the handsomest ornaments of our gardens. *W. frutescens*, Shrubby Wistaria, is found in Virginia and the Carolinas, in boggy places. It is an elegant climbing plant. *W. Chinensis*, Chinese Wistaria, is a deciduous climber, which, on account of its rapid

growth and hardy habits, has become very common in England, and is scarcely less a favourite than the laburnum. This species was originally called *Glycine Chinensis*, a name which in some places it still retains.

WISTON. [Pembrokeshire.]

WITCH-HAZEL. [Wych-Hazel.]

WITCHCRAFT (derived from the Saxon *wicca*, 'witch;' and *craft*, 'art' or 'cunning'), signifies, in the largest sense of the term, the use of all kinds of sorcery, charms, divination, incantation, fortune-telling, and intercourse with evil spirits, real or pretended. It is several times mentioned in the Bible; in the Old Testament in Exodus, Deuteronomy, and 1 Samuel, and in the New Testament in Galatians. In Exodus it is said 'Thou shalt not suffer a witch to live;' in Deuteronomy, all sorts of witchcraft and incantations are spoken of as 'an abomination to the Lord;' and in Galatians, witchcraft is mentioned among 'the works of the flesh.' It should be observed, however, as was first pointed out by the learned physician, Johannes Wierus, in 1563, that the word translated 'witch' in the Levitical condemnation, may likewise be translated 'poisoner.' In the ruder forms of savage life, where terror is the mainspring of religion, we find a belief in the reality of witchcraft deeply seated and universal, and generally accompanied, as among some African tribes of the present day, with rites of peculiar atrocity. The savage traces the misfortunes and calamities which he cannot comprehend to the agency of supernatural beings, before whom he crouches and trembles, and whom he strives to propitiate. Ambition or vanity tempts some man bolder and less scrupulous than his fellows to feign that he is in communication with these supernatural beings, and that he has the power of rendering them propitious or adverse. He thus readily acquires great authority and influence; and so it comes to pass that ignorance, imagination, superstition, and imposture blend and combine in creating a belief in the intercourse between human and supernatural beings, and in witchcraft as one of its chief manifestations. In ancient times, the Chaldeans and Persians were celebrated for their skill in divination and enchantment; and the Egyptians, in the Mosaic and Homeric ages, were famous for their proficiency in sorcery. The Greeks borrowed their magical rites from the East, whilst Roman magic was of Etruscan origin; but neither under the sway of Greece nor Rome do we find holocausts of victims offered up, as afterwards in Christendom, on the altars of a cruel and degrading superstition. The belief, however, was general that it was possible for human beings to inflict evils of various kinds upon their species through supernatural agency. This was admitted by all the different sects of philosophers, the Epicureans only excepted. In Rome, the Decemvirs passed a law condemning magicians to death; a similar law existed in the early days of Greece; and in the time of Demosthenes a sorceress, named Lamia, was actually put to death. But upon the whole, the persecution of witches and sorcerers among the ancients seems to have been singularly free from fanaticism. 'The magician was punished,' as has been well remarked, 'because he injured man, and not because he offended God.' The pagans, too, distinguished between good and bad magic, the theurgic and goetic; whereas, according to the Jewish and the Christian systems, all demons are evil spirits, and all intercourse with them is idolatry and heresy worthy of the severest punishment. The *Lex Cornelia*, one of the Roman laws usually cited against witchcraft, was also aimed against poisoning, and its occasion and cause were the conviction and condemnation of 170 Roman ladies for poisoning under pretence of incantation. Constantine, the first Christian emperor, permitted the exercise of magic whereby the fruits of the earth or the health of the body might be benefited; but punished with death the use of noxious charms and incantations. The first great persecution for witchcraft and sorcery in Christian times took place towards the close of the fourth century, shortly after the final division of the empires of the East and West, in the reigns of Valentinian and Valens. It raged most hotly at Rome and Antioch, but was also extended throughout the Roman world.

In the sixth century, the Emperor Leo issued a rigorous edict against witchcraft and sorcery. The Emperor Charlemagne severely persecuted those accused of such crimes; councils of the church, universities, and other learned and powerful associations united in condemning them; and at last, in 1484, Pope Innocent VIII. fulminated a bull formally denouncing witchcraft, and empowering inquisitors to seek out and burn all who were guilty of it. This bull, and the famous work of Sprenger, entitled 'Malleus Maleficarum' ('The Hammer of Witches'), in which the principles of the bull were more fully developed, gave a terrible energy to witch prosecutions throughout Christendom; especially as the Romish Church, with its usual astute and unscrupulous policy, purposely confounded witchcraft and heresy, making use of the former to stimulate fear and hatred against the latter.

The first edition of Sprenger's work appeared in 1489. It is conspicuous for its folly, cruelty, and injustice; and the author and the book are thus happily characterized by Michelet in his brilliant volume, entitled 'La Sorcière' ('The Witch'):—'He is a fool, but an intrepid one; he boldly lays down the least acceptable propositions. Another would have tried to elude, to weaken, to lessen objections. He does no such thing. From the first page he faces and states, one by one, the clear, natural reasons against the belief in diabolical miracles. Then he coolly adds, *So much for heretical errors.* And without refuting the reasons, he copies the opposing texts, St. Thomas, the Bible, the legends and glosses of the canonists. He gives you first plain common sense, then he pulverizes it by authority. He reseats himself satisfied, serene, a conqueror; he seems to say, "Well now, what do you say? Would you have the audacity to make use of your reason? . . . That certainly is unanswerable." With Sprenger and this manual of judges, declaring the least doubt *heretical*, the judge is bound down; he feels that he must not stumble; that if, unhappily, he was tempted to yield to sentiments of doubt or of humanity, he would be bound to begin by condemning and burning himself.'

The earliest statute against witchcraft in England was enacted in the reign of Henry VI., and additional penal laws were passed by Henry VIII. and Elizabeth; but it was not until the reign of James I., that sapient monarch—

> 'In quilted doublet, and great trunk breeches,
> Who held in abhorrence tobacco and witches,'

that witch prosecutions in this country assumed as gigantic proportions as those on the Continent. James' 'Demonologie' was published at Edinburgh in 1597; and in 1604 the English Parliament passed the 'Witch Act,' which subjected witches to death on the first conviction, even though they should have inflicted no injury upon their neighbours; and these two were as fatal to witches among Protestants as the bull of Innocent

VIII. and the 'Malleus' of Sprenger were among Catholics. The 'Demonologie' makes a great parade of abstruse and pedantic learning, but is full of folly and injustice; laying down among other things that any and every evidence is good against an exceptional crime like that of witchcraft, and that the testimony of the youngest children and of the most infamous persons ought to be received. Between the middle of the sixteenth century and the Revolution of 1688, and particularly during the reign of James, the sitting of the Long Parliament, and the Commonwealth, the number of witches tried and put to death in England was a disgrace to common sense, civilization, and Christianity. Nor were matters a whit better during the same period in Scotland; and in that country the variety and cruelty of the tortures inflicted upon the accused to compel confession were absolutely frightful. The mere account of them, as given in Pitcairn's 'Criminal Trials' and elsewhere, is sickening to read. Witches were tormented by having pins thrust into their flesh, and by being kept awake night after night; by having their legs, arms, and fingers tortured in the boots, caspie-saws, and pilniewinks, till often the blood and marrow spurted forth; and by being scourged with cords till the skin and flesh were torn from the bones. The penal statutes against witchcraft were not repealed until 1736, in the reign of George II. The belief in witchcraft is still, however, common and widely spread both in this country and on the Continent, especially among uneducated people, and in remote localities; and repeated trials have taken place, and convictions been returned, for the injuring and murder of supposed witches who have fallen victims to popular vengeance even within the present century. M. Gavinet, in his 'Histoire de la Magie en France,' gives a list of more than twenty instances of illegal persecutions for witchcraft between 1805 and 1818. In the latter year three tribunals were occupied with the trials of the murderers. Still later, in 1850, the civil tribunal of Tarbes tried a man and woman named Loubevoie for having caused the death of a woman named Bedouret. In England a number of witch persecutions resulting in severe injury or death, and trials for assault or murder, have taken place within the last forty years, showing how deep-seated is the belief in witchcraft, and how strong is still the empire of ignorance and superstition.

WITENAGEMOT, literally an 'assembly of wise men,' from the Anglo-Saxon *gemoth*, 'an assembly,' and *witan*, 'to know,' which has the same root, 'wit' or 'wis,' as the words wit, witness, wise, and the legal phrase still in use 'to wit.' As first constituted, the Witenagemot of our Saxon ancestors seems to have been an assembly of nobles or influential persons from various parts of the country, convened for the formal recognition of a new king, who owed the permanence of his position to their consent and support; and the assembly was summoned for the consideration and approval of any important law or regulation. No precise date can be given to its rise, but there is proof of its existence under Athelstan (931), and that all the sheriffs of counties attended it. In 934 there were present at one of these assemblies the king, four Welsh princes, two archbishops, seventeen bishops, four abbots, twelve dukes, and fifty-two thanes. The members were not elected, but either nominated by the king, or summoned by him after the assembly had been constituted; and they seem to have had the right, or assumed the privilege, of introducing a friend or counsellor.

WITHAM. [Essex.]

WITNESS. [Evidence.]

WITNEY. [Oxfordshire.]

WITTELSBA'CHIA, the name of a genus of plants belonging to the natural order *Ternströmiaceæ*, containing two species. They are magnificent trees. They have lobed leaves with pointed petioles, and large yellow flowers arranged in panicles. *C. gossypium* is a native of the East Indies, where it attains a height of 50 feet. It is the *Bombyx gossypium* of Linnæus. *C. insigne*, the *Wittelsbachia insignis* of Martius, is about 30 feet in height, and is a native of Minas Novas and Minas Geraes, in Brazil.

WIVELSCOMBE. [Somersetshire.]

WOAD (Ang.-Sax. *wad*), the *Isatis tinctoria*, or *Pastel* of the French, a plant yielding by the fermentation of its leaves a blue colouring matter resembling indigo.

WOBURN. [Bedfordshire.]

WODEN. An Anglo-Saxon deity, supposed to correspond to the Mercury of the Greeks and Romans. From Woden, Wednesday derives its name.

WOKINGHAM. [Berkshire.]

WOLF, *Canis lupus*, Linn. The common Wolf of Europe (*Canis lupus*), of which the Black Wolf (*Canis Lycaon*) is probably only a variety, is distributed throughout Europe generally, and a great part of Asia. In Africa the Wolf is represented by the Wild Hunting Dogs (*Lycaon*).

The common Wolf once abounded in our island, and continued to exist in Scotland and Ireland till within a very recent period. Everywhere the ravages of this ferocious animal have obtained for it the enmity of man. Calves, sheep, goats, hogs, dogs, young colts, and even adult cattle, fall victims to its cruelty. In Russia, Norway, and Poland, it occasions serious losses, nor is man himself secure. The same observations apply to the mountain districts of Spain, Portugal, France, and Italy, where the shepherds employ powerful dogs, scarcely less to defend themselves than to defend the sheep.

WOLF, FRIEDRICH AUGUST, a distinguished German philologist, was born at Haynrode, a little village at the foot of the Harts mountains, near Nordhausen, on the 15th February, 1759, which was also the year of the birth of Porson and Schiller. His father was village schoolmaster and organist of Haynrode, and was afterwards promoted to be assistant teacher of a girls' school at Nordhausen, the highest preferment he ever reached. His mother was a superior woman, and it was to her he owed the awakening of his intellectual life. At Nordhausen Wolf received a sound education under Hake, the head of the gymnasium, and while there he conceived that love of antiquity which never forsook him; and the same teacher also implanted in him the habit of judging for himself without being swayed by any authority, and of pursuing only one thing at a time. By following this system, and making good use of every hour, Wolf, before he went to the university, had read all the more important ancient, as well as German, French, English, Italian, and Spanish writers, and he used to say of himself, 'When I was thirteen I was a complete man.'

At the age of eighteen he went as a student of philology to Göttingen, where he had the advantage of the prelections of Heyne and Michaelis; but he still relied on his own powers and chiefly taught himself. Through the influence of Heyne he was, in 1779, appointed an assistant master in a government school at Ilfeld, where his ideas on the composition of the Homeric poems took root in his mind. In 1781 he was promoted to be head master in the grammar-school of Osterode.

These views of Wolf, so important for the consideration of all investigations relating to early literature, are of great and undoubted merit, and have been received with much favour in Germany. Lachmann and Köchly have even gone much further in showing the defects of the Iliad, and the results of their investigations have received the peculiar designation of the *Kleinlieder Theorie*, or 'Small-song Theory.' Köchly has even gone so far as to publish an expurgated edition of the Iliad in sixteen books, to replace the twenty-four which is the usual number of the divisions of the poem.

In England the belief in the individuality of Homer retains its ground. 'The Wolfian theory,' says Mr. Grote, 'explains the gaps and contradictions throughout the narrative of the Iliad, but it explains nothing else;' and Professor Arnold remarks, 'The work of great masters is unique, and the Iliad has a great master's genuine stamp, and that stamp is the grand style.' A famous saying of Professor Wilson may also be here given—'Some believe in twenty Homers, I believe in one. Nature is not so lavish of her great poets.' Professor Blackie in his able work on Homer states his views as follows:—'There remains a soul of truth in the Wolfian theory; but its operation is to be recognized among the rude materials which Homer used and fused, not among the shapely fragments of finished work which Pisistratus collected and arranged.'

Besides the works of the authors above quoted, full information with regard to Wolf will be found in his life, written by his son-in-law, Körte, entitled *Leben und Studien F. A. Wolf's des Philologen*: 2 vols. 8vo, Eissen, 1833.

WOLF-FISH (*Anarrhicas lupus*), a species of acanthopterygious, or thorn-finned fishes, belonging to the family *Gobiadæ*. Generic characters:—Head smooth, rounded in form, muzzle obtuse; body elongated, covered with minute scales; dorsal and anal fins long, distinct from the caudal; no ventral fins; teeth of two kinds, those in front elongated, curved, pointed, the others on the vomer, or chin, and jaws truncated, or slightly rounded; branchiostegous rays, six. The Wolf-fish is a British form, and is met with on the north and east coasts. It has also been captured on the eastern coast of Ireland. 'The appearance of this fish is not prepossessing. Independently of a ferocious-looking cat-like head, with an exceedingly thick, coarse skin, covered with slime, it possesses most formidable teeth, and neither wants the will nor the power to attack others or to defend itself. It is occasionally caught with a baited hook; at times decoyed into the meshes of a net by the temptation of feasting on the fishes already entangled; but fights desperately, even when out of its own element, inflicting severe wounds, if not cautiously avoided.' The food of the Wolf-fish consists chiefly of crustacea and mollusca, whose coverings its powerful jaws and rounded molar teeth enable it to break with comparative ease. Though the flesh is rejected for food in this country, it is not unpalatable. It is eaten by northern natives, after the skin is stripped off. It is known by the names—Sea-wolf, Sea-cat, Swine-fish, Wolf-fish, and Striped Sea-wolf.

WOLFE, JAMES, son of Colonel Wolfe, was born at Westerham in Kent, on January 2, 1727, N.S. A commission was obtained for him at an early age. In 1747 he distinguished himself at the battle of Laffeldt. During the seven years of peace which succeeded 1748 he gradually rose to the rank of lieutenant-colonel.

Hostilities recommenced between France and Great Britain in 1755. In 1758 Wolfe was despatched, with the rank of brigadier general, on the expedition against Cape Breton. The brunt of the French fire in landing before Louisbourg was borne by the left division under Wolfe. Louisbourg surrendered on the 26th of July. [CAPE BRETON.] Wolfe soon afterwards returned to England.

In 1759 an expedition was fitted out against Quebec. The command of the sea-forces was intrusted to Admiral Saunders; that of the land-forces (7000 men, including provincials) to Wolfe, who had been promoted to the rank of major-general. Montcalm, the French governor, had concentrated all the forces he could raise in the province of Quebec, and had fortified its capital in a masterly manner. Wolfe, on the night between the 12th and 13th of September, landed his troops immediately above Quebec, and, favoured by the night, ascended the heights of Abraham, which command the city. Montcalm, when he learned that the English were in possession of these heights, saw at once that nothing but a battle could save the town, and took his measures accordingly. The fight was strenuously contested, but the French at length gave way. Both generals fell in the action. Five days afterwards Quebec surrendered, and Canada was lost to France.

James Wolfe was killed in his thirty-fourth year. His remains were brought to England, and interred at Greenwich. A monument was erected to him in Westminster Abbey, which was voted by the House of Commons in 1759. His life has been recently published, with selections from his correspondence, and much new and valuable matter, by Robert Wright (London, 1864).

WOLFENBÜTTEL. [BRUNSWICK.]

WOLF'S BANE. [ACONITUM.]

WOLLSTONECRAFT, MARY. [GODWIN, MRS.]

WOLLASTONITE, or *Tabular Spar*, a rhombic, variously coloured, translucent crystal, consisting chiefly of silica and lime.

WOLSEY, THOMAS, was born at Ipswich in Suffolk, in 1471. His parents were poor but reputable persons, and possessed of sufficient means to provide a good education for their son. He was sent to Magdalen College, Oxford, where he graduated at the age of fifteen. He was made fellow of his college, appointed teacher of a school in connection with it, and was ordained. At this school were three sons of the marquis of Dorset with whom Wolsey became acquainted, and through whose patronage he obtained his first ecclesiastical preferment, the living of Lymington, in Somersetshire. He was now twenty-nine years of age, and possessed a winning address, great natural ability, and many acquirements. Sir John Nafant, treasurer of Calais, whose acquaintance he made in Somersetshire, named him his deputy, and by his influence at court procured for Wolsey a nomination as king's chaplain, and introduced him to Henry VII., in whose favour he soon gained a prominent place. He was sent on an embassy to Flanders relating to the marriage of the king, in which he gave the king great satisfaction; and it procured for him the deanery of Lincoln in 1508. In the following year the king died, and was succeeded by his son Henry VIII. Upon the young king's accession, Fox, bishop of Winchester, who held the offices of privy seal and secretary of state, made Wolsey the king's almoner. Before the year of the king's accession had passed, he had been appointed lord-almoner. In 1510 he became rector of Torrington; in 1511, canon of Windsor and registrar of the order of the Garter; in 1512, prebendary of York; in 1513, dean of York, and bishop of Tournay in France; in 1514, bishop of Lincoln, and in the same year, archbishop of

bined mortising, tenon-cutting, and boring machine. Its principal actions are self-evident on careful examination. The tool is extremely simple and well-contrived.

In fig. 1, Plate 2, we show the general elevation of Kinder's universal wood-shaping machine, the manufacture of Greenwood and Batley, Leeds. As an example of ready adaptability to the production of an almost inconceivable variety of forms, regular or irregular, this machine is unquestionably remarkable. It usurps the place of the workman, relieving him of all thought or labour. It consists essentially of certain cutter blocks, standing above a table and revolving on vertical axes, capable of almost endless variations and adjustments. Of its qualities we will say nothing; suffice it that, in general utility, it is unsurpassed.

Fig. 2, Plate 2, delineates Whine's patent dovetailing machine, manufactured by the Messrs. Worssam. This machine, when properly adjusted and worked, is perhaps the most serviceable of all wood-working tools. Its capabilities are numerous. It cuts out and finishes dovetails, and racks for bookcases; and is almost invaluable to the cabinetmaker. A sufficient idea of its manner of working may be gathered from an examination of the figure.

Figs. 3 and 4, Plate 2, represent the machines manufactured by Messrs. Bernier and Arbey—the mortising tool, and the machine à pousser les moulures. Neither calls for special notice.

Amongst the most noteworthy of recent tenon-cutting machines, we may mention that of Messrs. Powis, shown in fig. 1, Plate 3. This machine is suitable for the heaviest class of railway carriage. It is self-feeding, and has a fast return movement, after the work has passed the cutters.

Fig. 2, Plate 3, exhibits the general elevation of Bernier and Arbey's double tenon machine; which, whilst partaking of the usual character of these inventions, is framed in cast iron, and is peculiarly applicable for large shipbuilding and railway-carriage work.

One of the best planing, edging, tongueing, grooving, thicknessing, and moulding machines extant, is that of Powis, James, & Co. (Fig. 3, Plate 3.) It takes in anything up to 12 inches wide by 6 inches thick, and operates upon all four sides together, by revolving cutters, when employed for planing. It is fitted with a variable feed, to suit it for striking mouldings. The cutter heads are forged solid on the spindle, to avoid the danger of flying off. There is great accessibility to all its parts.

WOOD-ENGRAVING is the art of producing raised surfaces, by excision, on blocks of wood, from which impressions can be transferred by means of a coloured pigment to paper, or any other suitable medium, and generally applied to pictorial representations of objects.

The art of cutting both upon metal and wood ascends to a very remote antiquity. The Egyptians, indeed, seem to have made a close approximation to printing in their wooden stamps used for impressing characters on clay or other ductile material; and printing from engraved wood blocks has been practised by the Chinese probably from the tenth century.

In Europe the first application of the art took place in Germany, though the place is not exactly ascertained, but it is supposed to have been near Nürnberg, about the close of the fourteenth or beginning of the fifteenth century. It was probably first employed in the production of playing-cards, the outlines of which were formed by impressions from wood-cuts, and the colouring filled up by hand.

The oldest wood-cut with a date known to be in existence is of 1423. It was discovered by Heinecken, pasted on the cover of a manuscript in the library of the convent of Buxheim, near Memmingen in Suabia, and is now in the library of Earl Spencer. It represents St. Christopher carrying our Saviour on his shoulders across a river. It is by no means certain, however, that this print is the most ancient specimen we possess, as there are several others which, from their greater rudeness, have been held to have superior claims to antiquity.

The art made rapid progress. The next great step was the production of block books and the adoption of movable letters; and without entering into the disputed question of the dates of the 'Biblia Pauperum,' the 'Historia Virginis,' the 'Speculum Salvationis,' and others, they sufficiently prove the extension of its use, and many of the early books with movable types were illustrated with pictorial wood-cuts. Maps also were engraved on wood. In an edition of Ptolemæus, printed in 1482 at Ulm, there are twenty-seven; and in a later edition, printed at Venice in 1511, the outline, with the mountains and rivers, is in wood, while the names are printed with type, and in two colours, no doubt by separate workings. In 1486 the improvement known as 'cross-hatching,' by which the bold and free effect of a pen-drawing was endeavoured to be attained, was shown in Breydenach's 'Travels,' printed at Mentz. This invention has been usually attributed to Michael Wolgemuth, the master of Albert Dürer. [Dürer.] Seven years later appeared the 'Nürnberg Chronicle,' also said to be by Wolgemuth, but who probably only furnished the designs. Their execution is in a very superior style to that of any existing contemporary production: two fac-simile specimens are given in Jackson's 'History and Practice of Wood-Engraving,' London, 8vo.

The art had now attained an excellence which induced artists of celebrity and talent to select it as the means of conveying their designs to the world. Among the most distinguished in this line was Albert Dürer, whose productions as a painter, and an engraver on copper and wood, are so numerous as to excite a doubt whether he was actually the wood-engraver himself, or whether he only put the designs on the blocks, leaving them for other hands to execute.

In the early part of the sixteenth century several artists of celebrity were either designers on wood or engravers. Books also at this period were profusely illustrated. The art was chiefly practised in Germany, where it was patronized by the Emperor Maximilian, for whom Burgkmair produced the great work called 'The Triumphs of Maximilian.' The next great name in the annals of wood-engraving is that of Hans Holbein [Holbein], whose 'Dance of Death' was printed at Lyons in 1538, though Bartsch and Jackson deny that he engraved on wood, and Mr. Douce even questions his having been the designer. From about 1545 to 1580 wood-engraving continued to be much used for illustrating books, in England, chiefly by John Day. From this period there is little to be recorded of essential importance, till the appearance of Bewick, to whom the revival of wood-engraving is chiefly to be attributed. [Bewick.]

Bewick's best works were his 'British Quadrupeds' and 'British Birds' (1804), the last of which was reprinted in December, 1867, with impressions of the original cuts. They are remarkable for their fidelity, expression, and artistic feeling. His most eminent pupils were Clennell, Nisbet, and William Harvey, the latter of whom was equally skilful with the pencil as

with the United States is on the decline, as large numbers are now made in that country. The iron-work of fine plate locks is generally made by artisans working at their own homes in the rural localities of Brewood, Coven, Pendeford, and other villages between Wolverhampton and Stafford; but they are put together at Wolverhampton. The manufacture of cast-iron hollow ware is shared by Wolverhampton with Birmingham. There are also some extensive chemical manufactures, besides those of varnishes used in japanning, and the largest artificial-manure works in England are near the town. The hardware manufacturers in Wolverhampton, and most of the surrounding towns, are small factors, or masters employing only two or three hands, who make goods to sell to the merchants who come round. In the country parts the practice of farming is combined with that of labour at the forge. Generally speaking, all the goods made are remarkable for their beauty of finish and genuineness of workmanship.

In addition to its admirable situation with regard to coal and iron, Wolverhampton is partly indebted for the wonderful development of its trade to the excellence of its means of communication. Two of the oldest and most important canals pass through it; and it is also the focus of several large lines of railway, by means of which goods may be speedily transmitted to any port in the kingdom.

Wolverhampton was created a parliamentary borough by the Reform Act of 1832, and a municipal one in 1847. The latter is divided into eight wards, and governed by a mayor, twelve aldermen, and thirty-six councillors. The limits of the two boroughs are not co-extensive. In 1861 the population within the former, comprising the townships of Wolverhampton, Wednesfield, Willenhall, and Bilston (the two latter are described in the article STAFFORDSHIRE), and the parish of Sedgley, was 147,670: within the municipal limits (confined to Wolverhampton alone), 60,680. Two members are returned to the House of Commons.

The town was originally called Hamptun, and received its present name from Wulfrana (hence Wulfrana-hamptun), sister of King Egbert, who, in 996, established a monastery here, which Queen Mary remodelled into a collegiate chapter.

WOLVERINE. [GULO.]

WOLVERTON, [BUCKINGHAMSHIRE.]

WONDERS OF THE WORLD. The seven wonders of the world were, the Egyptian pyramids, the mausoleum erected by Artemisia, the temple of Diana at Ephesus, the walls and hanging gardens of Babylon, the Colossus at Rhodes, the statue of Jupiter Olympius, and the Pharos of Alexandria.

WOOD (Ang.-Sax. *wuda*), in the widest sense, is all that part of a plant that exists between the pith and the bark; in a narrower sense, it is applied only to those bundles of tissue which are called Woody tissue.

The two great classes of plants, Exogens and Endogens, yield very different kinds of wood in consequence of the manner in which their fibres are deposited. Endogens have no bark, and are generally hollow in the middle. The stems of Exogens are solid, and as the tree increases in age the wood increases in solidity. Hence a distinction is made between the centre of the wood of the trunk and its circumference, the one being called heart-wood, the other sap-wood.

The peculiar resinous, gummy, oily, and other secretions, give to the various woods their different colour, smell, and taste. The colouring matter is sometimes deposited in such abundance as to be available for dyeing, as in log-wood, red sanders-wood, and others used as dyes. Some have volatile oils deposited in them, which render them odoriferous, such as sandal-wood, rose-wood, and the wood of cedar, fir, and other trees. Frequently bitter and other secretions are deposited in wood, giving it a peculiar taste, and rendering it useful in medicine. That of the quassia is an example.

In the form of *Timber* wood is an indispensable article of fuel, and a considerable part of our cordage and textile fabrics, even the finest muslin and lace, are produced from the woody tissue. It is also extensively used in the manufacture of paper. Under the name of *Bois duré*, a kind of artificial wood for making ornamental articles has lately been used in France. Sawdust is first heated to a high temperature, and then subjected to very great pressure, and the wood thus produced is said to be harder and more compact than even the common wood. Sometimes blood is mixed with the sawdust before compressing, and imitations of rare and expensive woods are produced by the mixture of glue with sawdust, which may then be cast in moulds to any desired shape. Full details of the trade in wood are given in the articles TIMBER and TIMBER TRADE.

We append concise descriptions of some of the latest inventions in wood machinery.

Fig. 1, Plate 1, represents an ingenious band saw, the manufacture of Greenwood and Batley, Leeds. In many machines of this description, the blades remain plumb while working; and the table upon which the work is placed can be canted within certain limits either way in order to cut bevel work either at a constant or variable angle. In the band saw under notice, the table is fixed and horizontal; the saw blade itself, with pulleys and framing, is prepared to oscillate round the point in which the table is intersected by the saw, and consequently to change the angle of intersection for the like object. But notwithstanding the ingenuity of these machines, they are too frail and delicate for the work they undertake. Nothing but their power of executing the most rapid curves, and of steering through the most rapid changes of obliquity, has promoted their extensive diffusion.

In fig. 2, Plate 1, we show a wood mortising machine by the same makers as above. It is perhaps the completest of its kind. Replete with adjustments, and driven with power, it is equal to the best cutting tools in execution. It differs from its compeers, in that the mortise chisel begins its own mortise, without the preliminary of a bored hole. The wood is pierced, stroke by stroke, until the other end and the full depth of the mortise are reached. The wedged face and flat back of the chisel are then reversed, and the tool returns to complete the mortise up to the point whence it set out.

In fig. 3, Plate 1, are represented the two elevations of a mortising machine, by Messrs. Worssam. In this machine the cutting-tool calls chiefly for remark. It is an American screw auger, rapidly driven and working within a four-sided chisel, which rather more than circumscribes the diameter of the auger. A round hole is rapidly bored out by the revolving auger, whose cuttings are cleared out through apertures above in the sides of the prismatic chisel. And the chisel, plunging out and effectually enveloping the auger, clears out the four corners, and makes the round hole square. By advancing laterally, step by step, any length can be given to the cavity; and the mortise is made. The tool is quite self-acting, and is well adapted for railway-carriage making and shipbuilding.

Fig. 4, Plate 1, represents Powis and Co's. patent com-

3. *Picinæ*. Genera, *Picoides*, *Hemicircus*, *Campephilus*, *Dendrobates*, *Picus*.

4. *Dryocopinæ*. Genera, *Campethera*, *Dryocopus*, *Chloronerpes*, *Chrysoptilus*, *Melanerpes*, *Tripsurus*.

5. *Celeinæ*. Genera, *Gecinus*, *Hemilophus*, *Celeus*, *Meiglyptes*, *Tiga*, *Brachypternus*, *Centurus*, *Leuconerpes*.

6. *Colaptinæ*. Genera, *Colaptes*, *Geocolaptes*.

7. *Yuncinæ*. Genus, *Yunx*.

European Woodpeckers.

Picus martius, Linn. (genus *Dryocopus*, Boie; *Dryotomus*, Sw.); *Pic Noir* of the French; *Picchio Grande* and *Picchio Nero* of the Italians; *Baumhacker* of the Germans; *Great Black Woodpecker* of the British. (See Plate prefixed to this volume, fig. 2.)

This bird inhabits the north of Europe and Siberia principally; Norway, Sweden, Poland, and Russia, possess it; and it also appears in the Swiss mountains and those of Savoy and the Tyrol. It is rare in France and Germany. A few specimens have been shot in different parts of Great Britain.

Mr. Gould says, 'The flight of the present species is undulating, seldom protracted to any extent, but limited to a transit from tree to tree in the seclusion of its native woods. Its food consists of the larvæ of wasps, bees, and other insects; in addition, however, it devours fruits, berries, and nuts, with avidity. The female selects the hollows of old trees, in which she deposits two or three eggs of an ivory whiteness.'

Picus viridis; *Pic Verd* of the French; *Pico Verde* of the Italians; *Grünspecht* of the Germans; *Green Woodpecker* and *Popinjay* of the British.

This bird inhabits the European continent from Scandinavia and Russia to Spain, Provence, and Italy; the wooded districts of Greece; and England and Scotland generally. Its flight is short, undulating, and rather laborious. It obtains its food both upon trees and on the ground. A very large proportion of it is derived from ants and their eggs. Every person who has lived in the country must frequently have seen this gay-coloured woodpecker feeding at some ant-hill. In captivity it is very fierce, and must be chained.

The nest is generally formed in an elm or ash tree, and when the birds are excavating the hole on which they have pitched for its place, they are said to carry their chips to a distance. The eggs, from five to seven, are pure white, and are deposited on the bare loose decayed wood.

Picus major, the *Spotted Woodpecker*, has an extensive range, more so perhaps than that of any other European Woodpecker. It is found in Denmark, Norway, Sweden, and Russia; Europe generally to Italy inclusive; England, Scotland, and Ireland.

The group to which this species belongs, though they occasionally descend to the ground, are far more arboreal in their habits and manners than the Green Woodpeckers represented by the *Picus viridis*. They exhibit great dexterity in traversing the trunks of trees and the larger decayed limbs, in quest of larvæ and coleopterous insects which lurk beneath the bark, and to obtain which they labour with great assiduity, disengaging large masses of bark, or so disturbing it by repeated blows as to dislodge the objects of their search. Their flight is rapid and short, passing from tree to tree, or from one wood to another, by a series of undulations. In their habits they are shy and recluse. The eggs, glossy-white, and from four to six, are deposited at the bottom of a hole in a tree upon the decayed wood. This species more frequently makes that jarring noise for which the woodpeckers are distinguished, than either of the others, especially when disturbed from the nest.

Picus minor, Linn., the *Lesser Spotted Woodpecker*, is the least of the European Woodpeckers, but by no means the smallest of the family. It is pretty generally distributed over Europe, from Scandinavia and as far east as Siberia, to Italy. It is common in England, and frequents woods, orchards, nursery-gardens, and well-timbered parks. Near London it is very common, and may be seen by an attentive observer in Kensington Gardens, and in any of the parks in the neighbourhood. Nidification as in the previous species. Eggs, four or five in number, of a delicate flesh colour.

Asiatic Woodpeckers.

Picus squamatus. Locality, the Himalaya mountains. Allied in form and habits to the Green Woodpecker.

Picus Shorii. Locality, the Himalaya mountains. A brilliant three-toed species. (See Plate, fig. 1.)

African Woodpeckers.

Picus Cafer. Locality, Caffraria. This species inhabits the forests, and lives on insects and their larvæ which harbour in the moss that grows on trees and under their bark.

American Woodpeckers.

Picus pileatus (genus *Dryotomus*, Swainson), the *Larger Red-crested Woodpecker* of Catesby, *Pileated Woodpecker* of Pennant and others.

This bird is not unfrequent in well-timbered forests from Mexico to Canada, at least to the 50° N. lat. Catesby speaks of it as destructive to maize, by pecking holes through the husks that inclose the grain, and letting in the wet. The female lays about six snow-white eggs in the cavity of a tree. Two broods are said to be produced in a season.

Picus principalis, the *Largest White-bill Woodpecker* of Catesby; *Ivory-billed Woodpecker* and *Large Log-cock* of the Anglo-Americans. It inhabits Brazil, Mexico, and the southern states of North America. It is seldom seen to the north of Virginia, and rarely in that state.

It subsists chiefly on ants, wood-worms, and other insects, which it pecks out of rotten trees. Many thousand acres of pines in the southern states have been destroyed in a single season by the insidious attacks of insects, which in the dormant state are not larger than a grain of rice. It is in quest of these insects that the indefatigable Woodpecker exercises his peculiar labour. In the sound and healthy tree he finds nothing which serves him for food.

WOODS AND FORESTS. A considerable portion of the royal revenue formerly consisted of the rents and profits of the crown lands, which comprised numerous lordships and honours, together with forests and chases: from the forests the principal source of profit lay in the fines or amerciaments levied for offences against the Forest Laws. The demesne lands which were retained by the king, or which came to the crown by forfeiture or otherwise, and were farmed out to subjects, were originally very extensive; but owing to the generosity or the necessities of different kings, so large a part of them was granted away, that the Houses of Parliament frequently interposed in order to prevent the total alienation of the crown property. William III. had used the power of alienation so profusely, that upon the accession of his successor, it was enacted (1 Anne, s. 1, c. 7) that no grant or lease should be made of any crown lands for

a longer term than thirty-one years, or three lives, but permitting houses, &c., to be let for fifty years.

By the 46 Geo. III. c. 142 (altered by the 58 Geo. III. c. 65), an office of surveyor-general of his Majesty's works and public buildings was created; but this and some other offices were incorporated with that of 'the Commissioners of her Majesty's Woods, Forests, Land Revenues, Works, and Buildings' (2 Will. IV. c. 1, s. 1), who are commonly called 'the Commissioners of Woods and Forests,' which office or board owed its shape to the statute 10 Geo. IV. c. 50 (amended and extended by 2 Will. IV. c. 1; 2 & 3 Will. IV. c. 112; and 3 & 4 Will. IV. c. 69). The union of the works and buildings with woods and forests having been considered inexpedient, the Act 14 & 15 Vict. c. 42, placed the public works under separate control. An Act more recently passed (29 & 30 Vict. c. 62) introduced various alterations in the details of management. The Commissioners of Woods and Forests, who are not to exceed three in number, are appointed by letters patent (2 Will. IV. c. 1, s. 1). They act under the control of the Treasury, and the annual receipts and expenditure accounts of their department are audited by the commissioners for auditing public accounts. The annual income of woods and forests amounts to about 320,000*l.*

The real property of the Crown may be thus classified:

1. Honours, manors, and hundreds, not in lease.
2. Other lands in the occupation of the Crown, either for the personal convenience of the sovereign or for the public service.
3. Forests, chaces, and wastes.
4. Lands, tenements, and hereditaments, held of the Crown by lease.
5. Fee-farm rents, issuing out of lands, tenements, and hereditaments held of the Crown in fee-simple.

The second class comprises the royal palaces and houses, such as Windsor Castle, Buckingham and St. James' palaces, the palace of Greenwich (converted into an hospital for seamen), Somerset House, &c., &c.; and the parks of St. James, Hyde, Battersea, Victoria, Bagshot, Bushey, Greenwich, Hampton Court, Kew Gardens, Richmond, and Windsor. This class is now under the supervision of the board of Public Works and Buildings.

In the third class are included not only the royal forests which have preserved their *jura regalia*, but several nominal forests and chaces, warrens, wastes, &c. The following is a list of the real forests:—In Berks, Surrey, and Wilts, Windsor Forest; in Essex, Epping Forest; in Gloucestershire, the Forest of Dean; in Hampshire, Bere Forest, New Forest, and the Forest of Woolmer and Alice Holt.

WOODSTOCK. [OXFORDSHIRE.]

WOOL (Ang.-Sax. *wul*) is the term commercially applied to the hair of the goat, the sheep, the alpaca, the beaver, the rabbit, and to similar substances made use of in weaving or felting. It differs from ordinary hair in being always more or less undulatory, and in the overlying scales which the microscope shows to cover every filament. It is owing to these scales and to its general waviness that it is capable of being woven, as the fibres thus become caught or embarassed in each other, and the scales hook together, so that the filaments easily retain the twist given to them by the spinning wheel. The structure of the thread, and the texture of the cloth woven from it, depend on the comparative closeness and cohesion of the scales in the original substance. Thus arises the difference between *combing* and *carding wools*; the former are the least wavy, and, if we may use the expression, the less scaly; the latter being much waved and marked by numerous serratures are called carding wools, because they are prepared for spinning by passing through carding machines. The serratures, or points of the scales, are microscopically small, as many as 3000 being sometimes found, and seldom less than 1200, in a single inch.

The hair of the sheep has been treated as wool from the earliest antiquity. Woollen clothing is mentioned by Homer, and every reader will remember how Penelope occupied herself in spinning while waiting the return of her wandering Ulysses.

England early obtained a celebrity for her woollen products. Norfolk was the chief seat of the manufacture, whence it spread into the west of England, and especially into Somersetshire. The best wool then came from Derbyshire and Shropshire; the worst from Westmoreland and the South Downs, where the pasturage was of a poorer quality. It has been well observed that the great excellence and abundance of the English wool in mediæval times was due, in all probability, to the comparative effectiveness of the police of this country, or, as it was styled, to the maintenance of the king's peace. Large flocks of sheep can only be reared in lands which are safe from the ravages of war, and where the farmer is not called upon to supply the requisitions of marauding troops or rapacious freebooters.

The woollen manufacture was recognized by statesmen as so important a staple of national wealth, that its encouragement was the guiding motive of the foreign policy of England and the Low Countries during the fourteenth and fifteenth centuries. To obtain a free supply of English wool induced Jacques Van Artevelde to form an alliance with Edward III. The aggressive designs of the house of Burgundy, which then ruled over Flanders, were frequently checked by the necessity of avoiding any injury to the Flemish manufactures. The English government, on the other hand, in its anxiety to render the country independent of foreign supplies, used every means of promoting the home manufacture. For this purpose it interfered at times to limit or prohibit the export of wool, to fix its price, and to determine the places whereat it should be sold. The revenue was occasionally augmented by a tax on this never-failing article of supply, and we read of so many thousands of sacks, or a tithe of fleeces, as a common parliamentary grant to the necessitous sovereign.

It is said that the merino wool, for which Spain was formerly so celebrated, originated in the export of English sheep in exchange for Spanish horses, and their consequent cross with a native breed. Some of the descendants of the merinoes were carried to Germany at the beginning of the present century, and this gave rise to the fine Saxony wools. Many restrictions on the exportation of English and on the importation of foreign wool were continued until 1825, when it was subjected to a simple *ad valorem* duty of 1*d.* if worth more than 1*s.* per lb., or ½*d.* if worth less. This duty was abolished in 1840.

It should be noted that good wool is seldom found in connection with good mutton, and that the improvement in the breeds of sheep is detrimental to the quality of the fibre and the softness of the fleece. The best wool, moreover, is grown in a hot dry climate. For these reasons English wool has of late years been reckoned inferior to the merino, Saxony, and Australian wools, the last of which now commands the highest prices in the market.

Shorn fleeces are divided into two classes: first, *hogs*, or *tegs*, these being the first yield of the sheep; second,

wethers, or *curs*, the yield of succeeding years. The first class, or yearling fleece, is generally longer in the staple than, and in several other respects superior to, that of the second. *Skin wool*, or *pelt wool*, is cut from the skins of slaughtered animals, and being obtained in all stages of growth, varies in quality much more than fleece wool.

The different breeds of sheep are divided into two general classes, viz., long and short woolled; the long-stapled wool being used for worsted, and the latter for woollen goods. Of the long-woolled sheep the best native breeds are the Leicester, Lincoln, and Cotswold; of the short-woolled, the Down, the Welsh, and the Shetland.

The Lincoln wool is very long and silky in appearance, but coarse in texture. It is much used for 'lustres,' which are imitations of 'alpacas.' The Leicester is finer, but not so soft, and much esteemed for 'combing' purposes. Cotswold resembles Leicester, but is slightly coarser.

Of the Down breeds the finest is, perhaps, the Shropshire, on account of its silkiness and length in the staple. Next in value ranks the Norfolk. The South Down is short in staple, and small-haired; it is chiefly employed in the manufacture of flannels. The Hampshire and Oxford are coarse and long. Both the Welsh and Shetland wools are of hairy texture and inferior quality, being only used for articles which do not require shrinking or felting. Dorset is a soft, clean, useful wool; the Cheviot, small and fine-haired. The quality of British wools has been injured by the desire of farmers to cultivate good mutton-producing breeds, and rear large flocks for the supply of the meat market.

Among wool-producing countries we have shown that Australia now occupies the first rank. The Australian wool is well adapted for the manufacture of soft, elastic, and pliable stuffs, owing to its silkiness and the fineness of its staple. The breed has sprung from three merino rams and five ewes imported into New South Wales by Captain M'Arthur in 1797, and the remarkable increase in the flocks is one of the most curious facts in the history of the colony. A few years since the alpaca was introduced from Peru through the public spirit and indefatigable exertions of Mr. Ledger, but the wool produced has not yet answered the expectations of the promoter. The alpaca was also introduced into England in 1836 by the earl of Derby; and an immense alpaca factory, covering 11 acres, was erected at Saltaire, in Yorkshire, by Mr. Titus Salt, in 1852. [BRADFORD.]

The introduction of merinoes into South Africa has greatly improved the quality of the wool supplied by the Cape Colony, and the demand for it has, of late years, considerably increased.

Much of the Indian wool is very inferior, but large quantities are still imported, and manufactured into cheap low-class fabrics. The South American wool is of different kinds. That which is known as alpaca, being from 7 to 12 inches long, of various colours, and very fine, is deservedly held in high estimation.

The finest and most valuable of all wools is produced by the Tibetan goat, being found next the skin, under the animal's thick hairy coat. It supplies the material of the well-known Cashmere shawls, and in the native markets fetches the price of 6*s.* and 7*s.* per lb.

In Germany sheep are reared chiefly for the sake of their wool, and that of Saxony and Silesia is still unequalled in quality. In Austria the number of sheep is estimated at 30,000,000, and it is said that the fleece is often so exquisitely fine that twelve of its hairs will not exceed in thickness one hair obtained from a Leicester sheep.

The wool of Italy is from mixed merino breeds, and of excellent texture. Russia supplies various kinds, and France also holds a good place among wool-producing countries.

The amount of wool yearly grown in Great Britain is supposed to be 175,000,000 lbs., at an average price of 1*s.* 3*d.* per lb.; but the materials required for forming a correct estimate are rather meagre and unsatisfactory.

Up to 1791 no importations of foreign wool took place, the whole of the British cloths having previously been manufactured from native grown wool, the annual supply of which amounted to about 100,000,000 lbs. The first foreign growth came from Spain, and the quantity in 1803 had already reached 7,000,000 lbs. The fine Saxony wool then grew into favour, and took precedence of all others till 1841, when it was found that our own colonies could furnish us with a cheaper material. Australia entered into vigorous competition with its European rivals, and in twenty-five years its exports increased upwards of 100 per cent. Very little German wool is now used in Great Britain except for the finest broadcloths, ladies' shawls, and similar articles, while the supply from Spain has not only greatly decreased in quantity, but seriously degenerated in quality.

Our principal sources of supply are Germany, Australia, South Africa, South America, and the East Indies. The quantities received from these sources have varied of late years in a very remarkable manner, though the aggregate has steadily and rapidly increased; the most wonderful instance being that of Australia, from which country the imports increased from less than 2,000,000 lbs. in 1830 to 114,000,000 lbs. in 1866. We have already alluded to the introduction of the merino breed into the Australian colonies, and it is but right to notice the energy and perseverance with which the settlers have cultivated this source of wealth. The following table shows the amount received from every country in the latter year from which the supply exceeded 1,000,000 lbs.:—

	Quantities Imported.	Computed Real Value.	Average Price Fixed for the Value.
	Lbs.	£	Per Lb. £ s. d.
Russia,	16,908,481	833,899	0 0 11½
Denmark and Iceland,	2,261,320	117,833	0 1 0½
Prussia,	1,097,502	106,008	0 1 11½
Hamburg,	9,424,070	915,112	0 1 11½
Belgium,	1,097,165	75,528	0 1 4½
France,	3,699,178	309,526	0 1 8½
Portugal,	3,175,696	163,645	0 1 0½
Turkey Proper,	2,758,607	109,024	0 0 9½
Egypt,	2,403,185	124,577	0 1 0½
United States,	1,249,998	88,540	0 1 5
Peru,	4,436,221	277,945	0 1 3
Uruguay,	6,942,375	242,672	0 0 8½
Argentine Confederation,	4,804,235	142,878	0 0 7½
British Possessions in South Africa,	29,249,000	2,179,509	0 1 5½
Bombay and Scinde,	25,578,890	1,057,290	0 0 9½
Australia,	113,772,694	9,875,148	0 1 8½
Other Parts,	6,879,484	356,169	
	235,741,101	16,975,303	

In the same year there were imported, chiefly from Peru, 3,617,588 lbs. of alpaca, llama, and vicuna wool, value 575,568*l.*; and 4,392,662 lbs. of goats' wool and hair, nearly all from Turkey, value 761,040*l.*

The exports of wool from the United Kingdom in 1866 were as follow:—

	Quantity.	Value.	Countries to which the largest Quantities were Exported.
Produce of the United Kingdom.	Lbs.	£	
Coney and hares' wool,	335,933	91,332	United States.
Sheep and lambs' wool,	9,732,683	895,356	France and Hamburg.
Flocks and rag wool,	6,752,704	171,478	Belgium and the United States.
Foreign and Colonial Produce.			
Sheep and lambs,	66,567,913	5,016,399	France and the United States.
Alpaca,	5,575	883	
Coney,	900	383	
Goats' wool or hair,	21,622	3,784	
Other sorts,	56,896	6,797	
	83,474,226	6,186,462	

Worsted is spun wool, and derives its name from a town in Norfolk where its inventor resided, about 1340, and where the worsted manufacture is still extensively carried on. SHODDY is made from the rags of worsted goods; *mungo* from those of woollen. Both are treated in the same way; the rags being put into a machine called a willey, where they are torn to pieces by a revolving cylinder covered with short hooks, and the material reduced to wool capable of being re-worked. Shoddy is chiefly used in the manufacture of light cloths adapted for warm climates or indoor wear. The name has been originated by the Yorkshire spinners, and is derived from *shed*; a term formerly applied to the waste *shed* or thrown off in the process of spinning.

Mohair is the wool of the Angora goat, a native of Asia Minor, which produces a fine, long, silken, and pure white fleece, with an average length of staple of from 5 to 6 inches. Each animal, when clipped in April or May, yields from two to four lbs. of this wool, which has not been long introduced into England, and is chiefly employed for ladies' dresses. In 1866 the importation amounted to 4,200,000 lbs.; value, 778,000*l.*

The following chronological facts in the history of wool are borrowed from Haydn's valuable *Dictionary of Dates* (12th ed., 1863).

Duties on exported wool were levied by Edward I.,	1275
The exportation prohibited,	1337
Staples of wool established in Ireland, at Dublin, Waterford, Cork, and Drogheda,	1342
Sheep first exported to Spain,	1467
The export of wool from Ireland prohibited,	1521
Export of English wool, and importation of Irish wool into England prohibited,	1696
Export again forbidden,	1718
Act to prevent the running of wool from Ireland to France,	1738
Duty on Irish wool removed,	1739
Wool-combers' Act,	1794
Non-exportation laws repealed, 5 Geo. IV.,	1824

WOOLD, in Nautical phraseology, strengthening or supporting a made or started spar, by winding tarred ropes tightly round it at the injured or suspected place.

WOOLLEN MANUFACTURES. In the preceding article [WOOL] we have referred to the use of woollen garments among the nations of antiquity. Spinning and weaving were practised in Asia Minor from a very remote period, and Herodotus tells us that they were in vogue in Egypt, though in that country weaving was solely the employment of the male sex.

Throughout Europe, on the contrary, it was, in the earliest ages, the task of women only. The mother, assisted by her daughters, wove clothing for all her household. This domestic custom is the source in the works of the epic and tragic poets of many interesting *dénoûmens* and expressions of affection between 'kith and kin.' Thus, Creusa proves herself to be Ion's mother (Euripides, 'Ion,' 1416–17) by describing the pattern of a shawl which she had woven in her youth, and in which she had folded her infant son. Iphigenia discovers her brother Orestes (Euripides, 'Iphigenia in Tauride,' 814–17), and Electra recognizes him on another occasion (Æschylus, 'Choephoræ,' 225), by the figured garments which he wore, and which they long before had woven for him.

Weaving, both among the Greeks and Romans, was a distinct trade, carried on by the members of a particular guild or craft (*ὑφάνται, textores, textrices, linteones*); but every respectable private householder, especially in the country, was provided with a loom (*ἱστὸς, tela*), as well as with the entire apparatus needful in the working of wool. 'These occupations,' says Mr. Yates, in Dr. Smith's 'Dictionary of Antiquities,' 'were all supposed to be carried on under the protection of Minerva, specially denominated 'Εργάνη, who was always regarded in this character as the friend and patroness of industry, sobriety, and female decorum.'

Among the Romans the upright loom was in use; it is now discarded everywhere in Europe, except in some parts of Iceland. The roller on which the web was wound was turned by a handle. The threads of the warp were separated by a transverse rod or plank, and also divided into various parcels, to each of which was suspended a stone for the purpose of keeping the warp in a perpendicular position, and allowing the necessary play for the strokes of the spatha; which, however, at a later period was superseded by the comb (*pecten, κερκίς*) whose teeth were inserted between the threads of the warp, and thus made by a forcible impulse to drive the threads of the woof close together.

Probably the wool manufacture was introduced into England by the Romans, but it did not become an important staple until the era of the Conquest, when some Flemish weavers settled here under the patronage of the queen. During the stormy reigns of our early Plantagenets the trade again died out, but was revived in 1331 by an importation of Dutch weavers, at the command of Edward III. Its chief seat was then the county of Norfolk, and especially the towns of Norwich, Aylesham, and Lynn. The principal mart for the disposal of English and foreign cloth was Stourbridge Fair, which was held in a field about 2 miles from Cambridge, lasted a whole month, and attracted crowds of sellers and buyers from all parts of England and of Western Europe.

In 1530 was invented a new spinning wheel, which gave the trade a fresh impulse, and the settlement in England of the French Protestant refugees driven from France by the revocation of the Edict of Nantes, intro-

duced numerous improvements in the cloth manufacture. The invention of the spinning-jenny, mule, power-loom, the application of steam as a motive agency, and other ingenious devices, have since carried it to an unprecedented degree of prosperity.

Wools are divided into two principal divisions, *Carding* and *Combing Wools*, equivalent to *Short Wools* and *Long Wools;* and the fabrics woven from them are termed *Woollens* or *Worsteds*, according as the one or the other is employed. Carding wools possess in high perfection that peculiar property which enables the fibres to 'felt,' or interlace one among another, and thereby to form the firm compact material of which our cloth garments are chiefly made. But combing wools, despite the length of their staple, are deficient in this 'felting' tendency, and consequently are most suitable for stuffs, merinoes, hosiery, and articles of a similar description.

In our article on WEAVING, we have described in general terms the principal operations which the wool undergoes before it is converted into a wearing material. In the following remarks we shall, therefore, confine ourselves to the details which are peculiar to the woollen manufacture.

The wool is first sorted into several qualities, as first sort, or 'pick-locks,' second sort, third sort, and so on, sometimes to as many as six sorts.

The proper kinds having been selected, they are next 'scoured,' or washed, with an alkaline lye, to free them thoroughly from the grease which invariably adheres to them. If the cloth is to be dyed in the wool, that operation is now performed, and the cloth is then said to be 'wool-dyed;' if not dyed till after it has been woven, it is called 'piece-dyed.' Sometimes it is dyed 'in the yarn.'

Whether dyed or not dyed, the scoured wool must undergo the process of 'willying' or 'willowing;' the object being to open and disentangle the locks of wool, and cleanse them from sandy and other loose impurities. The willowing machine contains a number of revolving spikes, which tear asunder the woolly fibres, and a fan which blows away the dust from them. Such impurities as cannot be removed by this means are got off by a 'burring-machine,' and the wool is next examined by boys or women, called 'Wool-Moaters' or 'Pickers.' A further opening of fibres results from the operation of *scribbling;* but before this is effected, the wool undergoes that of *oiling;* being spread out on a floor, sprinkled with olive oil, and well beaten with staves. The 'scribbling machine' is very similar in its principle of action to the 'carding engine.' [COTTON SPINNING.]

The soft and flexible cardings into which the wool is now brought, and which are short pieces in the form of rolls or sticks, about half an inch in diameter, are next spun into yarn for the use of the woollen weaver; the process of spinning being generally effected by means of the 'slubbing-billy' and afterwards by the 'mule spinning' machine; the 'slubbing-billy' bringing the wool to the condition of a soft weak thread, and the 'spinning-mule' giving it the proper firmness and hardness for yarn.

The operations of scribbling, carding, and slubbing are now, in all large factories, continuously performed, by means of Apperly's 'patent feeder' and the so-called 'condenser,' which has rendered the 'slubbing machine' unnecessary. The waste resulting from the several processes is afterwards worked up into *Shoddy*. [WOOL.]

The next important stage is the conversion of the finished yarn into a textile fabric. [WEAVING.] Formerly woollen cloths were principally woven by hand-weavers; but the power-loom is every year superseding more and more the common loom.

As the wool has been dressed with oil before spinning, and with size before weaving, it becomes necessary to cleanse it from these impurities immediately after the cloth has been removed from the loom. This is the object of a second scouring process, in which the cloth is beaten with wooden mallets in a kind of trough or mill, an ammoniacal liquid being let in upon it first, and then clear water. Carried to the drying-room, or the 'tenter-ground,' it is stretched out by means of hooks on rails, and allowed to dry in a smooth and extended state. It is then taken and examined by 'the burler,' who picks out all irregular threads, hairs, dirt, and knots or 'burls.' After this it is ready for the important process of *fulling* or *milling*, which imparts to woollen goods that peculiarity of surface whereby they are distinguished from all others. A large mass of cloth folded into many plies is put into the fulling mill, where it is exposed to the long-continued action of heavy rollers. Superfine cloth undergoes four fullings of three hours each, a thick solution of soap being spread between the layers of cloth every time. This process, besides felting or interlacing the fibres together, thickens the cloth remarkably, but diminishes it about a fourth in length, and in breadth nearly one-half.

In the fulled state the cloth presents a woolly and rough appearance, to improve which it goes through the operations of 'teaseling' or 'raising,' and 'shearing' or 'cutting,' the object of the first being to raise the ends of the fibres above the surface, and of the second to cut them off to a uniform level. The raising of the fibres is effected by thistle-heads, teaseling-cards, or wire-brushes. Teasels are the seed-pods of the *Dipsacus fullonum* [TEAZEL], and are set in frames, arranged upon a large cylinder, the whole apparatus being called a *gig-mill*.

When the ends of the fibres have been thus raised to the surface, they are next 'sheared' or 'cropped,' a process of great beauty and singularity. Originally it was performed by means of large hand-shears, the cloth being stretched over a stuffed table, and the workman proceeding to clip the ends of the fibres in a regular and equable manner; but it is now effected by a machine, in which a revolving iron cylinder furnished with spiral blades travels horizontally over the cloth, and shears it.

The cloth having been raised and sheared, is brushed by a machine consisting of a system of brushes affixed to cylinders; being exposed at the same time to the action of the brushes and of steam. It is boiled or scalded to obtain a proper lustre, dyed, and finally subjected to the pressure of polished iron plates in a powerful hydraulic press.

An effective machine for forming 'bats' of fleece, and for feeding endless 'bats' to carding engines, has been introduced by Messrs. Ferrabee & Co., Stroud. A perspective view of it is given in the Plate 'Wool Machinery.' The strap, A, is the prime mover of the machine, and works a pulley, whose shaft gives motion, through the spur-wheel train, H, to the roller, B, which supports and moves the endless travelling lattice. D D are the levers of a vibrating frame, the long levers having their fulcra on the spindle of the roller, B, whilst the short levers are jointed to the carriages of the rollers, E. These latter are moved to and fro upon the top rails of the fixed frame by an endless belt and stud, taking with them the tin rollers, E, and the vibrating frame, D. At F is another endless travelling lattice, driven by the cone pulleys, G, and the chain and wheels therewith

connected; and it is across this lattice, F, that the tin rollers move. In action, the wool is received upon the endless travelling lattice, C, which the vibrating frames, D, move to and fro across the lattice, F, and lay the wool thereon in fine layers, one over another; but the lattice, F, being in motion at the same time, an oblique position is given to every layer a little behind the one which preceded it. The accumulative thickness of the layers depends upon the speed at which the lattice, F, is driven, and that can be regulated by shifting the straps on the cone pulley, G. The wool thus laid is passed from the machine by the lattice, F. The speed of the lattice, C, can be altered by the change wheels, so as to adapt the machine to fold any kind of wool. In the ordinary process of manufacturing wool, three several carding machines are required, a 'scribbler,' an 'intermediate,' and a 'finisher.' The three separate cardings are intended to effect a thorough mixing of the wool, and an uniform distribution of its fibres. But by the use of the wool lap machine these are dispensed with, or rather combined in one simple and continuous operation. A 'bat' feeding machine may be arranged to form and conduct 'bats' in a direct line from one carding machine to another, or it may be made to form what is termed a 'cross bat,' feeding it into a carding engine, placed at a right angle to that from which the fleece is taken.

Worsted Manufacture.—All combing wools are longer in fibre than the carding wools, but they are subject to the division into 'long' and 'short' combing wools; the long, varying from 6 to 12 inches in length, being used principally for coarse worsted goods, and the short, from 4 to 7 inches, for hosiery and some other purposes.

After the wool has been sorted, washed, scoured from the adherent grease, and dried in a heated room, it is carried to a machine called a 'plucker,' containing a pair of spiked rollers, by whose action it is cleansed, separated, and the fibres straightened, preparatory to the process of 'combing.' This is sometimes performed by hand, by means of two instruments filled with spikes, between which the wool is drawn till the fibres assume a regular arrangement; but a very efficient machine, invented by Heilmann and Lister, 1849–51, somewhat on the principle of the carding machine, is now generally used.

When the wool has been combed, it is transferred to the 'breaking-frame,' to open out any fibres which may have escaped the action of the combs, and to bring it into the form of a roll or narrow belt. The roll is lapped round a large bobbin or cylinder, passed a second time through a breaking-frame, and then subjected to the action of a machine analogous in principle to the 'drawing-frame' of the cotton manufacture; the object being to extend the length, diminish the thickness, and equalize the number of fibres of the roll or 'sliver.' Hitherto the woolly fibres have been but slightly coherent, without having any twist; but they are now passed through a 'roving machine' preparatory to the process of spinning. The roving and spinning are conducted much in the manner described in the article COTTON SPINNING. When spun, the worsted yarn is wound on a reel, and is then made up into hanks.

Here terminate the operations of a worsted mill. The dyeing of the yarn, and the weaving into the various kinds of textile fabrics, lead us to other departments of industry. [DYEING; WEAVING.]

Classification.—Plain *broadcloth* is a specimen of plain weaving, followed by the fulling process; whereas *kerseymere* is a twilled fabric, similarly fulled. *Serges* are twills, having worsted warp and coarse woollen weft.

Blankets are made of very soft yarn, afterwards worked up into a kind of pile by milling; and many varieties of coarse cloth are of analogous structure. *Bombazeen* is a twilled mixture of worsted and silk; *Poplin*, an untwilled, showing more silk than worsted on the surface. Goods called *Saxonies* and *Orleans* are made of wool, sometimes mixed with cotton, and afterwards printed. *Stuff* is made wholly of worsted; while *Merino* is a fine woollen twill, sometimes printed. The material called *Cashmere*, if properly so named, is made of the Angora or shawl-goat wool, much in the same way as merino; but most of the fabrics so called are woven from sheep's wool. *Challis* is a mixture of woollen weft with silk warp, and generally printed. *Mousseline-de-Laine* was originally all wool, but is now frequently mixed with cotton, and printed. *Norwich Crape*, unlike common crape, is composed of wool and silk, something like challis, but without being printed. *Crêpe de Lyon* is formed of worsted and silk; and *Italian Net* of worsted only. *Winceys* consist of wool and cotton, of coarser yarns than those used for Coburg cloths. *Poplins* and *Tabinets* are made of wool and silk. These examples are only intended to indicate the sources of the varieties in woollen and worsted goods, for to enumerate all the varieties themselves would be nearly impossible. This is particularly the case in respect to *Waistcoatings*, where fancy weaving adds to the sources of diversity.

Broadcloths are divided into 'superfines,' averaging from 56 to 60 inches wide; 'mediums,' from 54 to 58 inches; 'double milled,' from 54 to 56 inches; and 'Venetians,' from 54 to 58 inches. Narrow cloths, such as tweed, doeskin, and kerseymere, have an average width of about 27 inches.

The single-twilled worsted goods, for which Yorkshire is famous, include buntings, moreens, damasks, reps, camlets, serges, lastings, and shalloons.

Statistics.—The woollen manufacture forms, in the United Kingdom, one of the most important staples of our national wealth. It is carried on in twenty-two English, fourteen Scotch, ten Welsh, and six Irish counties. Superfine broadcloth is chiefly made in the West of England; but the great centres of all other kinds of woven stuffs are Leeds and Huddersfield, in Yorkshire. Tweeds and winceys are largely manufactured in Scotland; flannels, at Halifax, and in the Welsh counties; and blankets, at Witney, in Oxfordshire, and Dewsbury, in Yorkshire. The Scotch blankets are inferior to the English in size and quality.

The following tables will show the extent and distribution of our woollen and worsted manufactures according to the latest returns:—

RETURNS, SHOWING THE CONDITION OF THE WOOLLEN TRADE OF GREAT BRITAIN AND IRELAND IN THE YEAR 1861.

Counties.	Number of Factories in Operation.	Number of Spindles.	Number of Power Looms.
England and Wales:—			
Yorkshire, ...	924	1,296,190	11,405
Lancashire, ...	101	277,655	6,377
Gloucestershire, . .	49	59,986	618
Wiltshire, ...	32	44,825	549
Somersetshire, . . .	26	31,401	401
Montgomeryshire, .	43	20,926	262
Devonshire, ...	16	12,585	255
Other counties, . . .	265	103,288	477
Total, ...	1,456	1,846,856	20,344

bishop's income is 5000*l.*, and his country seat is at Hartlebury castle, near Kidderminster. He has the patronage of fifty-six livings. The dean and chapter hold the patronage of thirty-seven livings, and also the presentation to the mastership of St. Oswald's hospital.

WORCESTER. [MASSACHUSETTS.]

WORCESTER COLLEGE, Oxford (originally Gloucester Hall, which was established in 1283 for the use of the Benedictine monks of the monastery of St. Peter in Gloucester), was founded in 1714 for a provost, six fellows, and six scholars, the last to be elected from the schools of Bromsgrove, Feckenham, Worcester, Hartlebury, and Kidderminster; or, in default of persons properly qualified in these, from any other endowed school in the county of Worcester. The college afterwards received considerable endowments, until the number of fellowships was increased to twenty-one, and the scholarships to sixteen, but they were much restricted by conditions of relationship and locality. Under powers granted by the Act 17 & 18 Vict. c. 81, the fellowships have been reduced to fifteen, and are open without any preference, except that candidates for four fellowships, on the foundation of Mrs. Sarah Eaton, must not be possessed of any property, or income, exceeding 150*l.* per annum, and must be sons of clergymen of the United Church of England and Ireland. There are fifteen scholarships of the value of about 70*l.* each, and tenable for five years from matriculation; six on the foundation of Sir Thomas Cookes, for persons educated at Bromsgrove school; one on that of Dr. Finney, for natives of Staffordshire; five on that of Mrs. Sarah Eaton, for sons of clergymen of the Church of England, who require assistance to support them in the university; and three on that of Dr. Clarke, which are entirely open. There are also four exhibitions on the foundation of Sir Thomas Cookes, of the value of 42*l.*, for persons educated at Bromsgrove school; two left by Lady Holford, in aid of exhibitions from the Charterhouse; and one by Mr. Kay, for a native of Yorkshire.

Worcester College occupies two courts. The south side of the inner one still consists of the old buildings which belonged to Gloucester Hall. The chapel, a plain modern edifice, forms part of the general design for rebuilding the whole college. It was begun, together with the hall and library, in 1720. The range of new buildings on the north side of the inner court was not completed till 1776. The hall, forming the south wing of the entrance-court, was finished in 1784.

WORCESTERSHIRE, an inland county of England, is bounded N. and N.W. by Staffordshire and Shropshire, E. by Warwickshire, S. by Gloucestershire, and W. by Herefordshire. There are several detached portions of this county: the most important contains the town of Dudley, and is surrounded by Staffordshire. The greatest length of Worcestershire, N.E. to S.W., is 45 miles; the greatest breadth, E. to W., is 34 miles. The area is 738 square miles, or 472,165 acres. The population in 1861 was 307,397—150,997 males, and 156,400 females—which was an increase of 30,471, or 11 per cent., since 1851. The number of inhabited houses in the county at the time of the last census was 63,126; 3820 were uninhabited, and 352 were being built.

Surface.—Worcestershire is generally a flat country; on the eastern and western sides are two nearly parallel ranges of hills, which partly bound and partly intersect it: most of the intermediate space is a fertile plain. The eastern range begins on the N. in the Clent hills, extends N.W. of Bromsgrove, and terminates N. of Evesham. The western commences in the neighbourhood of Bewdley, and runs S. to the great chain of the Malvern hills, in which it terminates. The principal elevations not comprised in or bordering on these chains are Bredon Hill, about 3 miles S. of Pershore, Broadway, near the S.E. extremity of the county, and a small line of heights extending from Croome northwards towards Worcester. The Malvern hills are 1400 feet above the sea, but none of the other eminences in the county reach 1000 feet. Of the many extensive and beautiful vales, the principal is that of the Severn, which is 30 miles long.

Geology.—The geology of Worcestershire has been fully detailed by Sir Roderick Murchison, in his valuable work on the 'Silurian System' ('Siluria,' ed. 1868). It is composed for the most part of new red sandstone, lias, and oolite; other formations are visible in the chains of the Malvern hills, in the districts bordering on Tenbury, Bewdley, and Dudley, and in the Lickey and neighbouring hills in the N. part of the county. The new red sandstone comprehends that district which is watered by the Severn, together with the N.E. part of the shire. The lias formation is found at Pershore and Evesham, and in the vales watered by the Avon. The portion of the Malvern hills within the boundary of this county consists of trap; while the Silurian rocks, the Caradoc sandstone, Ludlow rock, and Wenlock limestone, appear in the northern portion of the chain. The lower coal and ironstone beds occur at its termination, north of Abberly Hill, in the forest of Wyre. Here also is found the old red sandstone formation upon which Tenbury stands. Bewdley is situated near the junction of the lower red sandstone with the coal-field of the forest of Wyre. The town of Dudley is in the midst of the thicker coal-measures, and mining is very extensively carried on there. In the neighbourhood of Droitwich and Stoke Prior occur saliferous beds, from which a large quantity of salt is manufactured. Building stone and clay are the only other minerals.

Rivers, &c.—Worcestershire is well watered. The principal rivers are the Severn, the Avon, the Teme, and the Salwarp. The Severn, which traverses the county from N. to S. nearly in the centre, is described under SEVERN AND WYE. The Avon enters Worcestershire on the E. near Cleeve Prior, and flowing in a very winding course past Evesham and Pershore, quits it about a mile from Tewkesbury, and soon afterwards falls into the Severn. It has been rendered navigable by locks throughout the whole length of its course in this county, which is nearly 20 miles. Barges of 60 tons can reach Stratford-upon-Avon. The Teme, which bears somewhat of the character of a mountain stream, and is not navigable, enters Worcestershire at its western extremity, and passing by Tenbury, forms here, as during other parts of its course, the boundary between this county and Herefordshire. It falls into the Severn about 3 miles south of Worcester. The Salwarp, a small river, rises N. of Bromsgrove, flows through Droitwich, and falls into the Severn near Claines.

The county is well supplied with railway accommodation by means of the Midland, North-Western, and Great Western lines.

The chief canal runs from Birmingham to Worcester, passing through the salt district of Droitwich, and having two branches, one to Dudley by way of Halesowen, and the other from King's Norton to Stratford-upon-Avon. From Dudley there is a canal to Stourbridge, Kidderminster, and Stourport, at which last place it opens into the Severn.

Climate, Soil, Agriculture, &c.—The climate of Worcestershire, especially in the middle, south, and west of the county, is remarkably dry, mild, and healthy, and the agricultural productions are brought to early maturity. The rain-fall is exceedingly small, being lower than that of almost any other district in England. The vales of Severn and Avon are but little raised above the level of the sea; and it has been observed that an elevation of 60 yards makes a difference in climate equal to a degree of latitude N., soil and other circumstances remaining the same. The higher parts of the county, between Bromsgrove and Birmingham, have consequently a later harvest. The still higher lands, such as the Malvern hills, are proportionally colder and later; but, on the other hand, they tend to shelter the intervening vales from the cold winds, and add to the mildness of the climate therein. Much of the surface is finely wooded. The vale of Severn contains some extremely rich alluvial soils, which are admirably adapted for pasturage. The banks of the Avon are also rich, and consist mostly of meadows and pastures. One-half of the county consists of rich loams and clay soils, and more than three-fourths of the entire area (viz., 368,381 acres) are under cultivation; 167,648 acres being permanent meadow or pasture land, while 120,480 are devoted to corn and 34,017 to green crops. In 1866 wheat was grown on 64,781 acres; barley on 20,696; oats on 7293; beans on 18,496; peas, &c., on 9214; potatoes on 4777; turnips and swedes on 16,944; mangold and vegetables on 3864; vetches, &c., on 8432; hops on 2321; and clover and artificial grasses on 31,631; while 12,284 were bare, fallow, or uncropped arable land. The number of sheep in the county in the same year was 204,154; and the ordinary stock of cattle was estimated at 45,923.

The farms are generally small, but are gradually being enlarged, by uniting several of them under one tenant. The large old farm buildings are generally good and substantial. The method of cultivation has been much improved during the last quarter of a century, and the average produce of wheat is now higher than in many other counties, being from 20 to 32 bushels per acre. Potatoes are raised in great abundance for the supply of Birmingham and other large towns. Wolverley sands have long been famous for the growth of carrots and for raising carrot seed. The ground is trench-ploughed. The banks of the Teme are lined with apple and pear orchards and hop gardens. The produce of the latter is considered by brewers to rank next to that of Kent. The vale of Evesham produces abundance of fruit and vegetables of the finest quality. There is no peculiar breed of cattle. They are chiefly obtained from Herefordshire and South Wales, and are fattened in large numbers on the fine pastures and meadows on the banks of the Severn and Avon. Dairy farming is also carried on to a considerable extent. The sheep are mostly of the Leicester breed, which suit the rich pastures. On the Malvern hills are some small hardy sheep, without horns, and with gray faces and legs, which make excellent mutton. Pigs and poultry are reared and fattened in large numbers. The horses for farm work are mostly of the strong black breed.

Manufactures, &c.—The chief industrial occupations in the county are coal and iron mining, and the manufacture of glass and iron at Dudley and Stourbridge; nail-making at Bromsgrove; salt-refining at Droitwich; carpet-weaving at Kidderminster; the making of needles at Redditch, and porcelain and gloves at Worcester. Large quantities of cider and perry are produced in some of the rural districts.

Divisions and Towns.—Worcestershire is divided into five hundreds and 249 parishes. It is in the diocese of Worcester, except a small portion, which is in that of Hereford; and in the Oxford circuit, the assizes being held at Worcester. For parliamentary purposes it is divided into East and West Worcestershire, each of which returns two members; besides which two members are returned for Worcester, and one each for Bewdley, Droitwich, Dudley, and Kidderminster: total, eleven members.

The following are the principal towns:—

Bewdley. [BEWDLEY.]

Bromsgrove, a market town, 13 miles N.N.E. from Worcester, and 12 miles S.S.W. from Birmingham, is situated in a fertile and wooded vale, on the small river Salwarp. The Midland Railway and Bristol and Worcester Canal pass near it. The town, which consists principally of one good street a mile in length, is well paved, and abundantly supplied with water. It contains a parish church, four chapels, a town-hall, market-house, and an endowed grammar-school. The tower and spire of the church are, together, 200 feet high, and are considered the finest in the county. The grammar-school was founded by Edward VI., and is in a flourishing condition. Nail and button making are the principal trades. Population of the town, 5262; of the parish, 10,822. In Bromsgrove Lickey, a range of hills on the N., the Salwarp and several affluents of the Trent and the Severn take their rise. In the vicinity is a mineral spring.

Droitwich, a market town and municipal and parliamentary borough, 7 miles N.N.E. from Worcester, 116 N.W. of London by road, or 126 by the West Midland Railway, is pleasantly situated on the Salwarp, in a narrow valley. Its chief trade arises from its salt springs, rising through strata of red sandstone and gypsum, from which salt has been made from time immemorial (the town was the Roman *Salinæ*, on the Salt Way, which united Worcester and Birmingham); but the quantity has been largely increased since 1725 by sinking the pits, which are in the centre of the town, to a greater depth, where the brine was found to be much salter, and from which it rose, as before, to the surface. It is first pumped into reservoirs, then passed into iron boiling pans, and the deposit afterwards dried in storehouses. The liquid yields 33 per cent. of salt. The quantity of salt now made is not less than 90,000 tons a year, and it is universally admitted to be amongst the very best in the world. Nearly one-half of it is exported to foreign countries. The Worcester and Birmingham Canal passes by Droitwich, and communicates with the Severn. The town is built in a rather irregular and straggling manner. There are three churches, three or four chapels, a court-house over the market, Coventry's hospital and schools, endowed with over 1200*l.* a year, and a lunatic asylum. It is the place of election, and a polling town for the E. division of the county, and is the head of a county court. The municipal borough is governed by four aldermen and twelve councillors: population in 1861, 3124. The parliamentary borough returns one member: population in 1866, 7081. The town is named from *wiches* (Saxon for salt-springs), the prefix *Droit*, 'right' or 'legal,' being supposed to refer to some exclusive privilege for the manufacture of salt granted to the inhabitants. Tesselated pavement and other antique Roman remains are occasionally discovered here.

Dudley, a market town and parliamentary borough,

26 miles N. by E. from Worcester, 8½ W.N.W. of Birmingham, and 121 from London by the South Staffordshire Railway, is situated in an isolated part of the county, which is surrounded by Staffordshire. It is close to the Dudley Canal, and near the extensive remains of Dudley Castle, which latter form a very interesting object on a height in the neighbourhood of the town, and are a striking contrast to the scene of activity and bustle beneath. The castle was founded in the year 700 by a Saxon chief named Dudo, from whom Dudley seems to be named, and was rebuilt in the reign of Henry II. It withstood a three weeks' siege by the Parliamentary forces, but was ultimately demolished during the civil war in the reign of Charles I. It was again rebuilt; and burnt down in 1750. Near the town are also the remains of a priory built in 1155. The houses in Dudley are generally neat and well built: the streets clean and well paved. There are five churches and twelve chapels; a new court-house; a museum of fossils from the Dudley caves; a grammar-school founded in 1562, and of which Richard Baxter, the celebrated nonconformist divine, was for some time master; several other schools, and a union. St. Thomas' church, rebuilt in 1819 at a cost of 23,000*l.*, is a fine Gothic structure with a lofty and conspicuous spire. The museum of the Geological Society contains numerous specimens of interesting fossils and minerals collected in the neighbourhood. Fossiliferous limestone abounds here, and is manufactured into beautiful ornamental articles. The immense caverns wrought into the limestone are very remarkable, and particularly interesting to the geologist. One of them extends nearly 2 miles into the solid rock, and is traversed by a canal, down which the quarried material is conveyed to the mouth of the tunnel. The roofs of these caverns are supported by massive limestone pillars, which impart an exceedingly grand and striking effect to the subterranean regions, when seen by torchlight. The limestone belongs to the Silurian system; and Dudley Hill is composed of basalt. The principal trade of the town consists in the smelting and working of iron ore, with which the whole neighbourhood abounds, as well as with coal and limestone. The articles manufactured are principally boilers, chain cables, fire-irons, fenders, grates, spades, scythes, and other iron utensils, nails, and flint-glass. The canal and railway facilities which the inhabitants possess afford the means of readily conveying these products to every part of England. The chief landowner is the earl of Dudley, who is the largest iron-master in the kingdom. The parliamentary borough returns one member: population in 1866, 48,953. At Saltwell, near Dudley, is an excellent spa; and in the vicinity are chalybeate springs.

Evesham, a market town, and municipal and parliamentary borough, 15 miles S.E. from Worcester, and 106 from London by the West Midland Railway, is situated on both banks of the river Avon, over which there is a fine stone bridge. The four principal streets are wide and clean, and the town has a cheerful appearance. There are three churches, four chapels, an old town hall, part of which is used as a corn exchange, market-house, public library, grammar-school, two banks, some oil, silk, and corn mills, and a manufactory of agricultural implements. In the neighbourhood there are several medicinal springs. The vale of Evesham is famous for the richness of its soil; and large portions of land near the borough are laid out in gardens, which supply the neighbouring towns and villages with vegetables and fruit. Evesham owes its importance to an abbey established there at a very early period, but of which there are now no remains except a gateway, and a beautiful campanile, or bell-tower, 110 feet high, that was commenced in 1533, or almost immediately before the dissolution of the institution. This is considered one of the finest existing remains of the time of Henry VIII. The municipal borough is governed by four aldermen (one of whom is mayor) and eighteen councillors; population in 1866, 4718. Formerly the parliamentary borough (which is coincident with the municipal) returned two members to the House of Commons; but it was deprived of one by the Reform Act of 1867. Near Evesham a battle was fought between Prince Edward, afterwards Edward I., and the confederated barons under Simon de Montfort, earl of Leicester, on the 4th of August, 1265. The latter were totally defeated, and their leader and his son killed. This victory restored Henry III. to the throne, but he and his successor were compelled to adopt the principles of their opponent, who was the real founder of popular representation in England.

Halesowen is a market town, 7 miles N.W. of Birmingham, and 24 miles N.E. of Worcester. It stands on the Stour, in a beautiful and well-wooded valley, and has a clean, yet active and busy appearance. The church is of Norman architecture, with a remarkably elegant spire, curiously supported on four arches. Outside the town is the chapel of St. Kenelm, which was originally erected in the time of the Saxons, and a part yet remains of that date. The far larger portion, however, was built in the reign of Henry III. There are three places of worship for dissenters, and a free grammar-school, founded in 1652, in which Shenstone, the poet, was educated; his monument is in the church. The chief occupations of the inhabitants are the manufacture of nails, chains, and coarser kinds of hardware, pearl and horn buttons, and tools. Steel is made at the hamlet of Congreaves, and coal is mined within the parish. An abbey of Premonstratensian monks was founded here in the reign of King John, and extensive ruins of it yet remain, but they have been partially converted into farming premises. In the vicinity of Halesowen is Leasowes, the paternal estate of Shenstone, who was born there in 1714. Population of the town, 2911; of the entire parish, 29,293.

Kidderminster, a market town, and municipal and parliamentary borough, 15 miles N. by W. from Worcester, and 136 from London by the West Midland Railway, is situated on both sides of the Stour, near its confluence with the Severn, and the Worcester and Stafford Canal also passes through it. The town stands on a hill, is generally well built and paved, and supplied with abundance of good water. The chief buildings are St. Mary's church, a large and venerable structure on the hill, partly in the perpendicular and partly in the decorated style; two other churches, eight chapels, a grammar-school, town-hall, market-house, prison, handsome music hall, bank, corn exchange, free library, infirmary, several almshouses, and a union. The town is the head of a deanery and county court. It was noted for its woollen manufactures in the reign of Henry VIII.; but for many years past it has been chiefly celebrated for the carpets (the best in England) made here. They are now chiefly woven by machinery. Wool-spinning, and the manufacture of tapestry, rugs, and fancy goods for upholsterers, are also carried on in the town. The Worcester and Stafford Canal affords water communication with Liverpool, Hull, and Bristol. The municipal borough of Kidderminster is divided into

three wards, and governed by six aldermen and eighteen councillors. The limits of the parliamentary borough, which returns one member, are the same as those of the municipality, and the population in 1866 was 14,064. The population of the parish of Kidderminster in 1861 was 20,870. Some of the houses are cut in the sandstone rock, and there are fragments of a castle. Near the town is a chalybeate spring, the road to which is an agreeable promenade; and in the environs are many handsome villas, the residences of the more wealthy manufacturers.

Malvern, or *Great Malvern*, 8 miles S.W. from Worcester, and 104 W.N.W. of London, is situated on the eastern side of the Malvern Hills. It is a favourite watering-place, and is much resorted to by invalids, not only for its medicinal springs, but for the salubrity of the situation. The wells are between Great and Little Malvern, the latter a small village about 3 miles to the south. Great Malvern is neatly built, and contains a fine old church, which formerly belonged to a monastery that was founded in the reign of Edward the Confessor. There are several good hotels and substantial private residences for visitors, besides some large establishments for the practice of hydropathic treatment, of which Malvern may be said to be the head-quarters. A preparatory college for boys was founded in 1864. The hills close by are 1400 feet in height, and command a magnificent view. Population, 4484.

Oldbury, a town in the parish of Halesowen, is about 29 miles N.N.E. of Worcester. It is situated on the Tame, and has rapidly risen into importance during the last twenty years in consequence of the extensive mines of coal and iron which have been discovered near it. The population increased from 5114 in 1851 to 15,615 in 1861, and is now (1868) considerably over 20,000. The town contains several churches, chapels, and schools, and some very extensive iron foundries and manufactories. It is a station on the Stour Valley Railway.

Pershore, a market town, 9 miles S.E. from Worcester, and 112 N.W. of London by the West Midland Railway, is situated on the W. bank of the Avon, which is here navigable for boats. The town, which consists principally of one street, nearly a mile in length, is well built and paved. Some of the inhabitants are employed in the manufacture of stockings, and wool-stapling; and others in the making of agricultural implements, and in raising fruits and vegetables for the large towns in the vicinity. There are two parish churches—one, small and mean; the other a large cruciform structure, with a lofty square tower—three chapels, a school, and some ruins of a Benedictine abbey, in which the parish church of Holy Cross was formerly included. Population of the town, 2905.

Redditch, a large village, 16 miles N.E. from Worcester, and 12½ S.S.W. of Birmingham, with which it is connected by railway, is situated in a fine district, and is remarkably well built. The inhabitants are chiefly employed in the manufacture of needles, pins, fish-hooks, and fishing-tackle, which are made to a large amount and of superior quality. Young women are principally engaged in the work, and in addition to the large English demand, immense quantities are exported. Redditch contains an Episcopal church, a fine Roman Catholic and other dissenting chapels, and two banks. Population, 5571.

Stourbridge, a market town, 20 miles N.N.E. from Worcester, and 142 N.W. from London by the Great Western Railway, stands on the S. side of the Stour—over which there is a stone bridge forming the communication with Staffordshire—and on a branch from the Worcester and Stafford Canal. The town is rather irregularly built on a gentle declivity, but its general appearance is handsome. The market-house is a spacious modern structure. The church was built in 1742. The living is a curacy, in the gift of the inhabitant householders. There is a free grammar-school, founded by Edward VI., in which Dr. Johnson received the rudiments of his education; various other schools, and places of worship for dissenters. The manufactures consist chiefly of iron, glass, and fire-bricks made of the Stourbridge clay, upon which the action of heat has less effect than on almost any other description. It is for this reason that it is used in crucibles, glass-house pots, &c., and its value in this respect is so well known abroad that it forms an important article of exportation. The clay occupies an area of about 200 acres, near the town, the best being found at a depth of 150 feet below the surface. Population of the township, 8166.

Stourport, a market town, 12 miles N. by W. from Worcester, is situated in the parish of Kidderminster, in the angle formed by the confluence of the Stour with the Severn. The Stafford and Worcester Canal, which communicates with Dudley, Stourbridge, and Kidderminster, also enters the Severn at this place. There is an extensive basin with wharfs and warehouses for the accommodation, and as a general depôt, of the trade in heavy goods between the west and central portions of the kingdom. The houses are mostly built of brick, and the general appearance of the town is neat and thriving. It has a church, Wesleyan chapel, tanyard, carpet factory, &c. The iron bridge over the Severn consists of a single arch of 150 feet span. Population of the town, 2958.

Tenbury, a market town, 18 miles W.N.W. from Worcester, is situated on the S.E. bank of the Teme, which is crossed by a stone bridge, leading into Shropshire. The Kyre, a small but rapid river, falls into the Teme at the upper end of Tenbury. The town, which consists of only three good streets, has a modern church, and a dissenting chapel. Population of the parish, 1947, who are employed in malting, tanning, and making gloves; and also carry on some trade in hops, perry, and cider. A salt spring was discovered here in 1859; and there are some mineral springs of considerable repute.

Upton-upon-Severn, a market town, 10 miles S. from Worcester, is a neatly-built and thriving place, mostly situated on a cliff near the S.W. bank of the Severn, over which there is a stone bridge. The church is a modern and handsome structure. The town also contains two chapels for dissenters, several schools, and a modern market-house, including a town-hall and assembly-room. There are no manufactures, but a good trade is carried on in corn, cider, malt, and coals and other heavy goods, as the river is navigable for barges of 100 tons, and a commodious wharf has been built here. Population of the parish, 2676.

Worcester is the capital city. [WORCESTER.]

History and Antiquities.—Of the early history of this county little is accurately known: there are, however, many evidences of its occupation by the Romans. During the Heptarchy Worcester was the principal Mercian see, and the inhabitants of the district were under ecclesiastical administration. After the Conquest the form of government was changed, and earls of Worcester were created, who had the civil power confided to them.

The antiquities of the county are not remarkable. Three Romans roads traversed it, and ancient encamp-

ments may still be traced at Malvern, Bredon, and on the hills at Woodbury and Witchbury. The principal Roman station was at Salinæ, the present Droitwich, on the Salt Way. The most important remains of ecclesiastical houses are the abbeys of Malvern, Bordesley, and Evesham, and the priories of Dudley and Dodford. There are also portions of the old Dudley, Hanley, and Hartlebury castles.

WORDSWORTH, WILLIAM, an eminent English poet, was born at Cockermouth, in Cumberland, on the 7th April, 1770. He was sprung both on the father and mother's side from a good old stock. His mother was descended from the Crackenthorps of Newbiggen Hall; his father's family had been planted in Cumberland for centuries. The father, John Wordsworth, was an attorney, and the agent of Sir James Lowther, the first earl of Lonsdale.

He received the first rudiments of education at Penrith, but after the death of his mother in 1778 was removed to the grammar-school of Hawkshead, in Lancashire. Here he was surrounded by the loveliest and most picturesque scenery, which made a powerful impression on his youthful imagination, and whose influences are discernible in his later poetry. He had already displayed a poetical bias, learning little Latin and less Greek, but poring indefatigably over the works of Cervantes, Swift, Pope, Gray, Goldsmith, and Fielding. He pursued a similar course of study on entering St. John's College, Cambridge, and consequently, in the four sessions he spent in its classic shades, earned no scholastic distinctions.

In 1790, and again in 1791, after taking his degree, he visited France, and through his strong liberal sympathies, and the intimate connection he formed with some of the leading Girondists, so far compromised himself, that, had he not been compelled to return to England, he would probably have incurred the vengeance of the extreme Republican party. It should be added that as years passed by Wordsworth's liberalism, always a matter of emotion and sentiment rather than of reflection, gradually died out, and was replaced by a moderate philosophical conservatism.

Wordsworth's first appearance as a poet was made in 1793, when he published 'An Evening Walk,' and 'Descriptive Sketches.' Novel in tone and construction, they passed unnoticed by the great body of the reading public; but their fine spirit was recognized by a few choice critics, and, among others, by Samuel Taylor Coleridge, who observed that 'seldom, if ever, was the emergence of an original poetical genius above the literary horizon more evidently announced.' A legacy, by a friend named Inisby Calvert, who had formed an equally high opinion of Wordsworth's poems, opportunely placed him in possession of a sum of 900*l.*; on the interest of which he and his only sister, Dorothy, retired to live a truly Arcadian life at Alfoxden, in Somersetshire. Here he was in close contact with Coleridge, and the first fruits of the intimacy of the two bards were the 'Lyrical Ballads,' published in 1798 by Joseph Cottle, of Bristol. They found an extensive audience, but Wordsworth had never perceived any truth in Milton's saying, that—

> 'Fame is the spur which the proud spirit doth raise
> To scorn delights and live laborious days.'

He never hungered after popularity, but, content with the appreciation of his own soul, would 'have lived and died unheard,' and uttered no complaint.

In 1802 he visited France and Germany, and on his return married Mary Hutchinson, who had been one of his childhood's friends, and whose marvellously sweet temper secured him a happy home to the very end of her tranquil and virtuous life. 'She was a remarkable proof,' says De Quincy, 'how possible it is for a woman neither handsome nor very comely, according to the rigour of criticism—nay, generally pronounced very plain—to exercise all the practical fascination of beauty, through the mere compensating charms of sweetness all but angelic, of simplicity the most entire, womanly self-respect and purity of heart speaking through all her looks, acts, and movements.' She brought the poet five children, of whom Thomas and Catherine died while they were young, his beloved daughter Dora in 1847, and John and William survived their father.

In 1808 Wordsworth removed to Allan Bank, near Grasmere, and in 1813 took up his final residence at Rydal Mount, where, amid his lakes and hills and valleys, he remained until the day of his death. Slowly but surely his poetical reputation extended, and his genius obtained a wider and warmer recognition, though he had to encounter the ridicule of the Edinburgh reviewers, and the storms of sarcasm and abuse lavished on the so-called 'Lake School,' of which he was presumed to be the inspiring *vates*. Much of this ridicule was due to the false theory of poetical expression which he had adopted and set forth in his earlier poems, and to his choice of such subjects as 'Peter Bell,' and 'Goody Blake and Harry Gill.' But as he successively gave to the world his 'White Doe of Rylstone' in 1814, his noble strain of 'Laodamia' in 1816; the magnificent music of 'Dion' in 1817; the deep insight into nature and calm philosophical meditation of 'The Excursion;' to say nothing of countless lyrics, songs, ballads, and sonnets, each of which is distinguished by some happy touch of feeling and felicity of phrase, detraction became dumb, satire flung aside its arrows, and England acknowledged the reign of a poet greater in all the purest and highest attributes of genius than any who had touched an English harp since Milton.

In 1813, through the generous exertions of Lord Lonsdale, Wordsworth obtained the appointment of distributor of stamps for the county of Westmoreland. The duties were in happy contradistinction to the salary, being as light as that was heavy, and the 500*l.* per annum placed him in competence for the remainder of his years. Few bards have been so comfortably situated, so free from the 'carking cares' of the world. He had only to sing, and there were thousands well content to be charmed by his singing. Nor could he be unaware of the extent of his influence on the literature of the age; how it was coloured by his modes of thought; how his love of and sympathy with nature was acting upon English poetry like an inspiration. There was latterly as general a desire to welcome and panegyrise every trifle that dropped from his pen as, at first, there had been an universal predisposition to involve his greater and lesser efforts in one comprehensive censure.

In 1839 Wordsworth received the degree of D.C.L. from the University of Oxford. In 1842 he resigned his distributorship of stamps in favour of his son, and received from government a pension of 300*l.* per annum. On the death of Southey, in the following year, he was invested with the poet-laureateship under peculiarly gratifying circumstances. He died on the 23rd April, 1853, from the effects of a cold caught about six weeks previously.

Wordsworth was of a goodly stature, five feet ten; robust, capable of great exertion and endurance, but not well proportioned. His face was very fine; the

forehead not remarkable for height, but for breadth and expansive development. The nose was a little arched and large, the mouth firmly cut, the eyes filled with a solemn and spiritual light, which seemed to emanate from some ideal world of beauty.

Such was the poet; of his poetry it is difficult to speak in the narrow limits to which we are restricted. Its most striking peculiarity is one to which we have already adverted—the intimate knowledge and love of nature that informs every line. He does not merely *describe* the mountain, and the stream, and the vale, the evening star, the harvest moon, the daisy, and the celandine, but he brings them into immediate contact with the reader's heart and mind, and shows their inner and deeper relations. Then his imagination was singularly 'compact' and elevated, enabling him to see what so few have seen—

> 'The light that never was on sea or land,
> The consecration and the poet's dream.'

Add to this, a singular dignity and gravity of thought, an intense depth of reflection, a capacity for the purest and solemnest feeling, a remarkable union of keen sensibility with subtle perception, an entire independence of all other poets, and a *curiosa felicitas* of expression which has only been surpassed by Shakspeare and Milton, and you obtain the leading characteristics of Wordsworth's genius. Of him, in fine, it may be said, as he himself has said of Milton—

> 'His soul was like a star, and dwelt apart.'

A memoir of the poet has been written by his brother, Dr. Christopher Wordsworth, D.D. Of his works there are editions in every size and form, and without at least one of these no student will or should consider his library or his bookshelf complete.

WORKING MEN'S CLUBS AND COLLEGES. These admirable institutions are designed to assist the mechanic, clerk, small tradesman, and operatives generally, in the acquisition of useful knowledge, and providing them with suitable lecture and class rooms, reading rooms, and the services of a competent staff of lecturers and teachers. They are self-supporting. The principal Working Men's College, though not the first, was founded in London, through the exertions of Professor Maurice and his friends, in October, 1854. It has proved eminently successful, and is affiliated with numerous similar institutions in the principal towns of England. *Working Men's Clubs* are equally numerous and prosperous. The first is supposed to have been established in Lancaster, in 1860, through the instrumentality of the Rev. H. Solly. For the more effective regulation and support of the various societies which have since sprung up all over the kingdom, the Working Men's Club and Institute Union was founded in June, 1862, under the patronage of the late Lord Brougham.

WORKINGTON. [CUMBERLAND.]

WORKSOP. [NOTTINGHAMSHIRE.]

WORM BARK, the bark of the *Andira inermis*, or Cabbage Bark Tree, of the West Indies. In the form of a decoction it is employed as a cathartic, emetic, and narcotic, in doses of from twenty to thirty grains.

WORMS. [ANTHELMINTICS; ENTOZOA; VERMES.]

WORMS, formerly an important free city of the Germanic empire, but now a decayed town in Hesse-Darmstadt, is situated in 49° 37′ N. lat., 8° 22′ E. long., near the left bank of the Rhine, and 25 miles S. from Mainz, with which it communicates by railway. In 1861 it had 11,399 inhabitants. The city is said to occupy the site of the Roman fortress Borbitomagus, or Augusta Vangionum, which was destroyed by the Vandals and Huns. The town was rebuilt by the Franks about 475, and called Worms. It was for some time the residence of Charlemagne, who held in its vicinity those primitive legislative assemblies which, meeting in May, were called Champs de Mai. Several diets of the German empire were held at Worms—among others those of 1495, convoked by Maximilian I., and of 1521, at which Luther appeared before the Emperor Charles V. [LUTHER.] The population of the city in the thirteenth century amounted to 60,000, and even after the Thirty Years' War was still 30,000. In 1689 it was burnt by the French, and only the old cathedral was spared. Since that time it has never recovered; some portions have indeed been rebuilt, but within the old circuit of its walls are now large vineyards and gardens. The most remarkable edifice is the dom, or cathedral, which has ten towers, and is externally one of the finest Romanesque buildings in the world. There are five other churches and two synagogues—one of the latter being at least 800 years old. A magnificent monument to the memory of Luther and his fellow reformers was completed in 1868. The Rhine is crossed by a swing bridge. Worms has a gymnasium, manufactories of sugar of lead and tobacco, several tanneries (the making of polished and morocco leather employs 2000 hands), and a good trade in corn, cattle, and wine. The highly esteemed *Liebfrauenmilch* wine is made from grapes grown on a hill near the cathedral.

WORMWOOD. [ARTEMISIA.]

WORSTED. [WOOLLEN AND WORSTED MANUFACTURES.]

WORTHING. [SUSSEX.]

WRACK, or WRECK, a popular name for the marine vegetation cast ashore by the waves. As *Fuci*, or true sea-weeds, make up the greater part of this, the name *Wrack* is specially applied to certain fucoid species, as, for example, *Fucus nodosus*, or Knotted Sea-weed; *F. vesiculosus*, or Bladder Wrack. The latter is the fucoid which supplies *kelp*. Along with them the stems and fronds of dulse (*Rhodymenia palmata*), tangle (*Laminaria digitata*) are found mingled, and the term Wrack is applied to the whole heap. The name Grass-wrack is given to another form, the *Zostera marina*.

WRANGLER, a word derived from the public disputations in which candidates for degrees were formerly required to engage, as a test of their abilities. It is now used at the Cambridge University to designate those who achieve first-class honours in the public mathematical examinations, which are confined to pure and mixed mathematics, and are continued through eight days. All those gentlemen who are successful in the first three days are entitled to the degree of Bachelor of Arts. The examinations on the remaining five are only undergone by those competing for honours, the successful candidates for which are divided into *wranglers*, *senior optimes*, and *junior optimes*. The student passing highest in the first-named is called *senior wrangler*. The number of wranglers is not limited. It varies annually from thirty-five to forty-five, and is sometimes even more.

WRASSE, the English name of a number of beautiful fishes inhabiting the rocky parts of the coast, and belonging to the genus *Labrus* of Linnæus, and family *Labridæ*. They are prickly-spined and hard-boned fishes, with oblong scaly bodies and a single dorsal fin.

WRATH, CAPE, in Sutherlandshire, is the most N. point of Scotland, being situated in 58° 38′ N. lat., and 4° 58′ W. long. On a pyramidal granitic rock

here, a lighthouse has been erected, which shows a revolving light 400 feet above the sea.

WRECK (Lat. *wreccum maris*; Fr. *wreck de mer*, sometimes written *wreche*, *werec*, and *seup-werpe*, quasi *sea-up-werpe*, i.e., *ejectus maris*), signifies in our law such goods as after a *shipwreck* are cast upon the land by the sea, and left there within some county, for they are not *wrecks* so long as they remain at sea in the jurisdiction of the Admiralty (2 Inst. 167). Where such goods are cast from a wrecked ship into the sea, and then sink and remain under water, they are called *jetsam*, or thrown goods, unless when mariners in danger of shipwreck throw the goods, being heavy, into the sea, with a cork or buoy attached to mark the place where they sink that they may be found again. Goods found *floating* on the sea after a ship has sunk or been cast away are called *flotsam*. The term *derelict* is also applied to goods wilfully forsaken or left, or cast by the sea on to the shore above watermark. The laws relating to wrecks of ships and goods, and the preservation of life and property, or the prevention as far as possible of such catastrophes and casualties, have of late years undergone very careful revision and codification. In 1854 the first great step in this direction was taken by the Board of Trade, through which department, with the assistance of the Customs, the great consolidation called 'the Merchant Shipping Act, 1854,' by which, with the exception of a few sections of secondary importance, thirty statutes from the early part of the reign of Queen Elizabeth to the eighteenth year of the present queen, besides many stray sections in other Acts, were repealed, and the amended law brought into one statute of 548 clauses. With this statute the laws relating to the registry of British ships were combined. This great work of consolidation was accomplished by Mr. Farrer, secretary to the Treasury, assisted by Mr. Thring, parliamentary draughtsman, and Mr. Hamel, solicitor for the customs, to whose management the legal business relating to merchant shipping under this and the subsequent amendment Acts, of which there are several, has been consigned. The principal Act, as it is very appropriately called, is divided into eleven parts, viz.:—1. The Board of Trade and its general functions; 2. British ships, their ownership, measurement, and registry; 3. Masters and seamen; 4. Safety and prevention of accidents; 5. Pilotage; 6. Lighthouses; 7. Mercantile marine fund; 8. Wrecks, casualties, and salvage; 9. Liability of shipowners; 10. Legal procedure; 11. Miscellaneous. It is of course the eighth part of this Act that chiefly has reference to the present subject. It authorizes the Board of Trade to institute inquiries in cases of wreck and casualty, and prescribes the machinery by which these investigations are carried on. An inquiry into the cause of the loss of a ship is conducted by the solicitor for the customs, or his assistants, before two justices of the peace, or one stipendiary magistrate, and a nautical assessor appointed by the Board of Trade, that the tribunal may have the benefit of professional knowledge in sifting the cause of the catastrophe. It is evident that great advantage must result from these inquiries, because, when the cause of the calamity is discovered, the probability is that it becomes suggestive of preventive measures. Of course, if the accident is attributable to the carelessness, or incompetency, or misconduct of the master or mate of the ship, all that can be done by way of prevention for the future is to punish the offender by depriving him of his certificate of competency, without which he cannot again be employed in the same capacity, or by suspending the certificate for such a period of time may appear adequate to the offence; ships being inte dicted under the third part of the Act from proceedi to sea without duly certificated masters and mate But when the accident arises from the want of son light or beacon to warn the mariner of danger, or fro collision with some previously unknown reef of rocks, other impediment not noted in the charts, &c., th remedy is obvious, and the power of applying it provided by the sixth part of the Act, &c. The im portance of such investigations cannot be too highl estimated, when it is considered that the averag number of wrecks and casualties on the coasts of th United Kingdom and surrounding seas during the ten years ending 1866 amounted to 1466. But the most melancholy feature of the case is the numerical increas year by year; in 1864 the number was 1390, in 1865 it was 1656, and in 1866 it was 1860, with a loss of about 900 lives. As a somewhat gratifying conclusion to the melancholy story of shipwrecks, it is satisfactory to add that 'the Royal National Life-boat Institution' —which has a noble fleet of nearly 200 life-boats under its management—records that, in the year 1867, the number of lives rescued by its life-boats was 789; by shore-boats, to the crews of which it granted rewards, 303; besides thirty-six vessels saved by the life-boats, giving a total of 1092 lives saved in one year through its instrumentality.

WREN, a name given to many birds, as the Wood-wren, the Willow-wren, the Reed-wren, &c.; but the true Wrens form a group of the family *Certhiadæ* [CREEPER], and are represented in Europe by that familiar little bird the Common Wren, *Troglodytes Europæus*, Cuv.; *Motacilla Troglodytes*, Linn.; *Roytelet* of the French.

The Wren inhabits Northern and Central Europe; Iceland, Greenland; England, Wales, Scotland, and Ireland; Orkney and Shetland; Spain, France, and Italy.

This popular little favourite, which has become sacred like the Robin, from the confidence which it shows in courting the neighbourhood of man, creeps about the hedges, making small flights, and in its search for insects and worms generally entering the lower part of the hedge and working upwards. Like the robin, it will sing cheerily even in mid winter. The nest is large in proportion to the bird, and the shape is general oval, the top being in the form of a dome, and the entrance by a small hole at the side. It lays from seven to ten, and even more eggs.

WREN, SIR CHRISTOPHER, born at East Knoyle, Wilts, October 20, 1632, was the son of Dr. Christopher Wren, chaplain in ordinary to Charles I., and dean of Windsor. From his father he seems to have inherited a taste for scientific and literary studies. He was entered at Wadham College, Oxford, in his fourteenth year, and soon distinguished himself in mathematics and natural philosophy. While at Oxford he associated with Hooke and other scientific men, whose meetings laid the foundation of the future Royal Society. In 1653 he was elected a Fellow of All Souls' College, Oxford. In 163 he was appointed to the professor's chair of astronomy at Gresham College, London, and three years after to that of Savilian professor at Oxford, when he resigned the former chair. On the establishment of the Royal Society he became a member. In 1661 he was appointed by Charles II. assistant to Sir John Denham, the surveyor general, and was commissioned in 1663 to survey and report upon St. Paul's Cathedral, with a view to its restoration. Meantime, Wren had been employed

the Sheldonian Theatre at Oxford, and Trinity College, Cambridge. He visited Paris in 1665, where the works of the Louvre were then in progress. At the beginning of the following year he returned home, when the great fire of London opened an extensive field for his talents. He made a survey of the whole of the ruins, and proposed a plan for laying out the devastated space in a regular and commodious manner, with wide streets and squares, and a line of spacious quays along the Thames; but this idea was lost sight of altogether in rebuilding the city; and Wren was employed in erecting the Royal Exchange, Custom House (both since destroyed by fire and rebuilt), Temple Bar, the Monument, and several churches, all of which were finished before St. Paul's was begun. In 1672 he received the honour of knighthood; and in 1674 married a daughter of Sir John Coghill, after whose decease he took for his second wife a daughter of Viscount Fitzwilliam, an Irish peer; and by both these ladies he had issue.

During this time he had prepared various designs and models for the intended cathedral; but the one which he himself was most solicitous to see adopted was set aside by the city authorities for that of the present structure. The first stone of the building was laid June 21, 1675; the choir was opened for divine service in December, 1697, and the whole was completed in thirty-five years, the last stone on the summit of the lantern being laid by the architect's son, Christopher, in 1710. The cathedral has two transepts, the intersection of the nave and great transept being surmounted by a magnificent dome. The architecture is of the Italian style, based on the Roman. The entire length of the building is 512 feet; breadth of the great transept, 283 feet; height of the dome, 360 feet; the nave is 170 feet long, 39 broad, and 90 feet high. Wren resigned the office of Savilian professor in 1673; he accepted that of president of the Royal Society in 1680, and he also sat several times in Parliament, but his numerous and important professional engagements left him little leisure for other pursuits or duties. Enjoying the favour of successive princes, he was employed by Queen Mary to complete the buildings at Greenwich, to be appropriated as a royal naval hospital. He also made additions to Hampton Court and Windsor Castle.

After the death of Anne, the last of his royal patrons, he was dispossessed of his office of surveyor-general, which he had held for forty-nine years. The last five years of his existence he passed in retirement. He was found dead in his chair after dinner, February 25, 1723. His remains were deposited in the crypt of St. Paul's, and over the entrance to the choir were inscribed the words, 'Si monumentum quæris, circumspice' ('If you seek his monument, look around.')

All Souls' library at Oxford contains a collection of original drawings by Wren. Among the numerous buildings erected by him, besides those already named, are St. Mary-le-Bow, Cheapside; St. Stephen's, Walbrook, the interior of which has been restored; St. Bride's, Fleet Street; St. Andrew's, Holborn; Christ Church, Newgate Street; St. James', Westminster; the Monument; and Chelsea Hospital.

WREXHAM. [DENBIGHSHIRE.]

WRIETZEN. [BRANDENBURG.]

WRIGHTIA, the name of a genus of plants belonging to the class *Dicotyledones*, and natural order *Apocynaceæ*, or Dog-banes. This genus is named after Dr. W. Wright. The *Wrightia tinctoria* yields a dye like the indigo.

WRITER, in Scotland, is a term of nearly the same meaning as attorney in England, and is generally applied to all legal practitioners who do not belong to the bar of the supreme court. It has of late become customary to substitute for it the term of solicitor. As special exceptions, the body who in Edinburgh enjoy, concurrently with writers to the signet, the privilege of conducting cases before the Court of Session, the Court of Justiciary, &c., are called solicitors of supreme courts (abbreviated S.S.C.), and the practitioners before the sheriff court of Aberdeen are by ancient custom called advocates. The practitioners or procurators in the sheriff courts (which answer to the county courts of England, but have far more extensive jurisdiction) are now regulated by the Procurators' Act, 28 & 29 Vict. c. 85 (1865).

WRITER TO THE SIGNET, abbreviated W.S., is the designation of the members of the most numerous and important class of attorneys or procurators in Scotland. They enjoy, in common with the solicitors of supreme courts, the privilege of conducting cases before the Court of Session, the Court of Justiciary, and the Commission of Teinds. Their peculiar privilege, however, is that of preparing the writs which pass the royal signet, now of rare occurrence.

WRITING is the art of giving expression to our thoughts and feelings in some visible and permanent form, so as to communicate them to others. It is, therefore, the product of a tolerably advanced stage of civilization. The savage is unable to write, and when precluded from making known his ideas by speech, resorts to some kind of gesture or sign—to, in fact, a species of 'dumb alphabet.' He looks upon writing with naive wonder, and cannot understand the process by which a piece of paper is converted into an agent between man and man—an agent which is not affected by distance, but will convey an individual's ideas across mountains, valleys, and seas. The missionary Williams relates an amusing story illustrative of this fact. Having occasion to despatch a messenger to his wife for some tool he stood in need of, he wrote down his wants in pencil on a chip of wood, and handed it to one of his savage attendants, with instructions to carry it to his mistress. The savage demurred. He thought Mrs. Williams would consider him guilty of a rude joke, if he put into her hands without explanation a rude, rough chip. But at last he obeyed. Great was his surprise when Mrs. Williams, after looking at the pencilled missive, went into her house, and returned with the required implement. How did she know what was wanted? Who had told her? Mrs. Williams replied, 'The chip.' The savage, lost in wonderment, went from one to another, exclaiming, 'The chip speaks;' and it was long before he could be made to understand the secret, though he saw the efficacy, of written language.

The necessity of a written language is not felt, as we have hinted, until a community or people arrives at some considerable degree of civilization. Whilst a tribe consists of a few families, inhabiting the same confined area, and engaged only in such limited labour as is requisite to provide them with food and clothing, they can make known their sentiments to one another by speech. But as the tribe increases in numbers; as they spread over a wider and yet wider district; as they break up into separate communities and devote themselves to different pursuits; as trade springs into existence from the first rude schemes of barter and interchange—it is obvious that the want of some mode of intercommunication will be severely felt. Evidently men will at the outset attempt to express themselves by signs. If A desires to exchange an ox for a sheep, he will make known his wishes to B by rude delineations of these

animals. This is called *ideographical* or *kyriological* writing. After a while, the process will be simplified by the adoption of some symbol, which by common consent stands for a particular object, and which, in the first instance, bears some rough resemblance to that object. Such is the case in the *Hieroglyphs* of Egypt (see Plate 2, 'Writing,' prefixed to this volume). Such was the case, too, in the written language of Phœnicia, of Assyria, of the Mexico of the Aztecs, and of ancient China. Take, for instance, the letter A. In its Phœnician form it bore some likeness to the head of an ox, and hence, both in Hebrew and Greek, its name, Aleph —in Greek, Αλφα, *alpha*—is the name also of an ox. By degrees this resemblance became very faint. Men found a need of writing more and more rapidly, and consequently with less and less attention to the original symbol, until at last the developed letters lost all trace of their origin, and were completely arbitrary in shape. The different stages by which a written language arrived at this result are clearly exemplified in the cursive hieroglyphics of Egypt, where the hieratic forms can scarcely be identified with the ancient symbols.

But the growth of a language does not stop here. It is soon recognized that to express everything by its appropriate sign is a slow, cumbrous, and awkward affair. To every object, therefore, is attributed a certain sound; and these sounds are represented syllabically. Instead of a sign to indicate the sea, a sign is chosen to indicate its roaring; and as there is a similarity of sound between the roaring sea and the roaring thunder, the same sign will stand both for sea and thunder. This is a great step in advance. When the same symbol represents three or four different objects, it is evident that much has been done towards the simplification of a language; and when the symbol is represented syllabically, still more has been effected towards securing its regularity of structure.

Then comes the culminating process, when some man of original genius traces back these syllables, as it were, to their component elements, and invents letters. Some written languages, as the ancient Egyptian and the Chinese, have never advanced so far; the modern Chinese alphabet being an European invention for European purposes. The Mexican writing (see Plate 1) only arrived at the expression of syllables; but by calling in the aid of colour, and varying the size and arrangement of its phonetic symbols, gave considerable facilities for the record of thought.

It is unknown when or by whom the alphabet now in use amongst most civilized nations was invented. That it was brought from the East may be inferred from the traditions which attribute its origin to Thoth or Kadmus. It is most probable that it was not the solitary invention of one man, but the result of the labours of many. It is probable, moreover, that at one time two or three alphabets existed, though these were afterwards fused into one, the Phœnician, which bears evident traces of Egyptian origin.

From the Phœnician came the Semitic, which branched off into the Hebrew, the Syriac, the Armenian, the Mongol; and the Grecian, which originated the Etruscan, the Oscan, the Umbrian, and the Roman. From the latter has sprung the principal alphabets of modern Europe. [ALPHABET; CUNEIFORM; HIEROGLYPHICS; PAPYRUS.]

WROXETER. [SHROPSHIRE.]

WÜRTEMBERG, a kingdom situated in the south-west of Germany, between 47° 35′ and 49° 35′ N. lat., 8° 15′ and 10° 30′ E. long., is inclosed by Bavaria and Baden with the exception of a small strip of the south boundary, which is formed by the Lake of Constan Its greatest length from S. to N. is about 130 miles; greatest breadth is 95 miles. The area is 7840 squ miles, and the population at the end of 1864 w 1,748,328. The two principalities of Hohenzollern l longing to Prussia, are almost wholly surrounded Würtemberg.

Surface, Climate, &c.—The surface is genera mountainous, the lowest part being 420 feet above t sea; on the east the Swabian Alb or Alp enters the cou try, and the western border is covered by the northe Schwarzwald (Black Forest), both of which send o branches in all directions. The Schwarzwald, whi runs from S. to N., slopes gradually towards the cent of the kingdom. It consists chiefly of granite and sand stone, and is intersected by many well watered valley The highest points of the northern Schwarzwald are th Hornisgrinde, 3640 feet, and the Rossbühl, 2943 fe high. The Dobel is the highest cultivated part. Th Swabian Alp, which lies entirely in Würtemberg (except ing a small portion in Hohenzollern), runs from S.W. t N.E. about 80 or 90 miles, with a mean breadth of about 14 miles, and forms part of the watershed between the Neckar and the Danube. On the north-west side it is steep, but on the south-east gradually declines into undulating hills. Though not so elevated as the Schwarzwald, it is more bleak and barren, and contains several large stalactitic caverns.

The principal valleys are those of the Neckar and the Danube. They are of an average height of 500 feet above the sea. The chief rivers are the Neckar [NECKAR-KREIS] and the Danube, into which almost all the others, which are invariably small, discharge themselves. The Lake of Constance is the only considerable one in the kingdom, but small lakes are numerous.

The climate is mild and healthy, with, of course, the variations which arise from differences of elevation. The winter is long on the summits of the Alp and the Schwarzwald, and it is there too cold to produce corn; but they are covered with forests, and pasturage is found in the summer.

Soil, Products, &c.—Würtemberg is one of the most fruitful countries of Germany. Agriculture is on the whole conducted upon a good system, and more corn is raised than is required for the local consumption. A manifest improvement has taken place in the breed of cattle and horses during the last few years. The chief agricultural products are spelt, maize, oats, barley, rye, wheat, peas, beans, vetches, potatoes, flax, hemp, rape-seed, poppies, hops, and tobacco. Cherries, damsons, walnuts, peaches, apricots, and the more common fruits and vegetables are raised very extensively, and a good deal of cider is made. In the circle of the Neckar figs and melons ripen in the open air. The entire area of the kingdom is 4,757,000 English acres, of which, according to the latest returns, 3,010,833 are under cultivation (exclusive of vineyards), 1,235,708 acres being devoted to corn, and 457,745 to green crops; while 868,629 are permanent pastures, meadows, &c. In 1867 wheat (including spelt) was grown on 544,284 acres; barley or bere on 237,904; oats on 317,982; rye on 102,162; potatoes on 167,948: turnips, beet-root, and vegetables on 60,210; rape, colza, and other green crops on 229,587; clover and artificial grasses on 194,906; and 253,845 acres were bare, fallow, or uncropped arable land. The vineyards cover about 80,000 acres. More than three-fifths of the whole are in the circle of the Neckar, the rest being chiefly on the

river Tauber and the Lake of Constance. The wines of these last districts are very different from those of the Neckar, rather resembling Rhenish. Rich pastures, cultivated fields, orchards, gardens, hills covered with vines and mountains with forests, afford the most diversified scenery.

Natural and Industrial Resources.—The metals and minerals are cobalt, silver, copper, lead, zinc, iron, marble, millstone-grit, freestone, quartz, precious stones, porcelain earth, potter's clay, fuller's earth, chalk, salt, and a little coal. Native sulphate of lime is worked, and there are mineral springs at Cannstadt and Stuttgardt. The salt works are the property of government, which has the monopoly of the trade; the annual yield is about 24,000 tons. There are extensive peat lands, the produce of which is used for fuel; and from them a large revenue is obtained. Some quarries of excellent building stone are also worked in the country.

The industrial products include linen and woollen cloths, calicoes, silks, lace, hosiery, muslin, carpets, leather, paper, porcelain, earthenware, iron and steel ware, gold and silver plate, tobacco, tobacco-pipes, and gunpowder; there are likewise numerous printing establishments, distilleries and breweries, and chemical factories. The manufacture of wooden clocks and toys, which are exported to all parts of Europe and America, is extensively carried on in the Black Forest and other places. Würtemberg has a very considerable trade in its natural productions and manufactures, its horned cattle, horses, sheep, timber, wool, and printed books. The imports consist of raw cotton, silks, glass wares, wine, fruit, cheese, china, earthenware, and all kinds of colonial produce. There is likewise a very great transit trade. The inland navigation is important, especially on the Neckar, which becomes navigable at Cannstadt, and many steamers are also employed on the Lake of Constance. Railways connect all the chief towns, and communicate with the more important continental systems. The whole of the lines within the kingdom belong to the state.

Divisions, Chief Towns, &c.—Würtemberg is divided into four circles, which, with their respective areas and population, are as follows:—

Circles.	Area in Square Miles.	Population in 1864.
Neckar-Kreis, . .	1,306	512,107
Schwarzwald, . .	1,861	435,045
Donau-Kreis, . .	2,549	380,866
Jaxt, ...	2,124	420,310
Total, . . .	7,840	1,748,328

The increase in the population is very slow, and twice within recent years the census has even shown a decline. Emigration draws off a considerable number of the inhabitants, varying from 5000 to 21,000 annually. Failure of the precarious wine harvest, and 'over-population,' are generally assigned as the causes of this exodus.

Revenue.—The revenue and expenditure of the kingdom are each about 1,270,000*l.* per annum, and there is a public debt of 3,500,000*l.*, more than half of which has been expended in the construction of railways. The principal coins in use are—in gold, the *ducat*, 9*s.* 3*d.*; and in silver, the *gulden* or florin, nearly 1*s.* 8*d.*

The army is formed by conscription, to which all healthy men who have passed the age of twenty-one are liable. Substitution is allowed. The number of recruits to be raised is determined every three years by a special law passed by the Chambers. At a recent military conference held at Stuttgardt, it was decided that the total military force of the South German Confederation should be 130,800 men, of which Würtemberg should supply 25,200. The period of service is six years; but, as a rule, the men are sent home on furlough, in the infantry, at the end of eighteen months, and in the cavalry, at the end of two years, though they are liable to be called upon afterwards for occasional military practice. At the end of six years the active army has no more claim upon the soldier; but his name is entered next upon the register of the Landwehr, or militia for the defence of the country.

Government, Social Condition, &c.—The constitution bears date September 25, 1819. It provides for absolute freedom of person and property, liberty of conscience and speech, and limited liberty of the press. All citizens are equal before the law, and no privileges and no monopolies of rank and birth are allowed to exist. In the king rests the sole executive power, but it has to be exercised through ministers responsible to the country. The legislative power is given jointly to the king and the representatives of the people, and the consent of both parties is requisite to give decrees of either the head of State or the Chambers the force of law. The Parliament, or Landtag, consists of two houses, called together every three years, or oftener if necessary. The Upper Chamber, or House of Standesherren, is composed of the members of the royal family, the heads of the principal noble families of the country, the representatives of certain territories and estates formerly possessing a vote in the German Diet, and a number of members nominated by the king for life. The latter, however, must not exceed one-third of the whole House. The second Chamber, or House of Deputies—Abgeordneten—consists of thirteen members of the nobility, elected by the Ritterschaft, or noblesse of the kingdom; six superintendents of the Protestant church; one Roman Catholic bishop; two other representatives of Roman Catholic bodies; the chancellor of the University of Tübingen; and seventy-one deputies of towns and rural districts. All the members of the second Chamber are chosen for six years, and they must be thirty years of age: a property qualification is not necessary. To be a member of the first Chamber it is sufficient to be of age. The president of both houses is appointed by the king; for the Upper House without restriction, and for the Lower, from among three members elected by the deputies. The debates of the second Chamber are public, and have to be printed and distributed among the various constituencies. Whenever Parliament is not sitting, it is represented by a committee of twelve persons, consisting of the presidents of both Chambers, two members of the Upper, and eight of the Lower House. A special court of justice, called the Staats-Gerichtshof, is appointed guardian of the constitution, as well as of rights and privileges of the houses of Parliament. It is composed of a president and twelve members, six of whom, together with the president, are nominated by the king, while the other six are elected by the combined Chambers. The executive of the kingdom consists of six ministerial departments, presided over by the king, or a member of the royal family nominated by his Majesty.

The last census states the religious creed of the inhabitants as follows:—Evangelical Protestants, 1,190,000; Roman Catholics, 530,000; dissenters of various denominations, 2500; and Jews, 12,000. The 'Evangelical Protestant' Church of Würtemberg was formed in 1823, by a union of the Lutherans and the Calvinists, or

X to an Englishman is the representative of what might as well be denoted by the two consonants *ks*. But in the Greek alphabet it was merely a guttural aspirate, equivalent probably to the German *ch*. The letter X was the last in the Roman alphabet, neither Y nor Z belonging to it. The words in which those two letters occur are not really part of the Latin language, but borrowed from the Greek, as *zephyrus*, *zona*; or from some Eastern source, as *gaza*. Such forms as *lachryma*, *hyems*, *sylva*, are errors of modern editors. The Romans themselves wrote *lacruma* or *lacrima*, *hiems* or rather *hiemps*, and *silva*. In Algebra *x* is the usual symbol for the unknown quantity which is to be determined.

The interchanges of *x* with other letters are as follow:—

1. *x* with *c*, as in the double form of the Latin or Greek preposition *ex* or *ec*.

2. *x* with *sc* or *sk*. [See S.]

3. *x* with *g*, as in the Latin *augeo* compared with the Greek *αυξανω*; and *μιγ-νυμι* compared with *mix*, English, and *mix-tus*, Latin.

4. *x* with *ps*, as the Latin *exilis* compared with the Greek *ψιλος*. Thus, too, *proximus* is the superlative of *prope*. This change is another instance of the interchange of *p* and *c*, so common between Greek and Latin. [See C.]

5. *x* with *z*. In Spanish a *z* is found where the Latin has an *x*. Thus, the Latin words *crux*, *pax*, have become in Spanish *cruz*, *paz*.

XANTHEIN (Gr. *ξανθος*), the yellow colouring matter of flowers. The yellow colouring matter of leaves is called *Xanthophyll*, from *φύλλον*, 'a leaf.'

XANTHIAN MARBLES. These interesting marbles form one of the most attractive portions of the collection of antiquities in the British Museum. They consist of a large collection of sepulchral relics of various ages, first made known to the European public by the late Sir Charles Fellows, who discovered them in 1838, in or near Xanthus, the ancient capital of Lycia.

XANTHIC ACID (Gr. *ξανθος*), is composed of sulphur, carbon, hydrogen, and oxygen, and is usually obtained by agitating bisulphuret of carbon together with a solution of potassa in strong alcohol. Its name is derived from the peculiar yellow colour it possesses. Its atomic composition has been represented as $HO, C_8 H_5 OS_4$.

XANTHOCHYMUS (Greek, *ξανθος*, 'yellow,' and *χυμος*, 'juice'), a genus of plants belonging to the natural order *Clusiaceæ*, or the Gamboge family, trees or shrubs with a resinous juice, or yellow-gum resin.

XANTHORIZA, literally 'yellow-root,' a genus of dicotyledonous plants belonging to the natural order *Ranunculaceæ*, and containing only one species, the *X. apiifolia*, noted for its intensely bitter bark, which is used in America as a tonic.

XANTHORRHŒA ('yellow juice'), the grass tree, a genus of monocotyledonous plants, belonging to the natural order *Liliaceæ*. It is a native of Australasia. There are several species. All are noted for their long, linear, close-set leaves. From the centre of the mass of leaves rises a long terminal spike of flowers. The leaf mass and flower spike together rise to a height of from 4 to 8 feet. They yield a reddish yellow acrid resin, which when burnt sends out a strong odour of benzoin. *X. hastilis* yields the resin which reach this country.

XANTHUS. [Lycia.]

XEREZ DE LA FRONTERA, a town in Spai situated in 36° 41′ N. lat., 6° 7′ W. long., near t right bank of the Guadalete, on the railway from Cad (63 miles distant) to Seville, with a population of 39,00 The old town, inclosed within the walls, has narrow an crooked streets; those of the new town, outside, a broad and regular, and contain a large number of goo houses. There are eight parish churches, a college, tw free schools, six convents, twelve suppressed monasteries four hospitals, an alcazar or fort (now in ruins), and many Roman and Moorish antiquities. Some woollen fabrics and leather are made here; but the only commerce of Xerez is in the wine of the surrounding district, the well-known *Sherry*, which is principally sent to England *via* Cadiz. Its name is derived from that of the town, which is pronounced 'Sharez.' The magazines of the merchants are remarkable for their extent, and are called *bodegas*. The vineyards, chiefly situated on slopes, are scattered over an immense area, but probably actually occupy only about 12,000 acres. On the plain outside Xerez was fought, in 714, the battle which finally overturned the Visigothic monarchy of Spain, and placed a large portion of the country under the dominion of the Moors for several hundred years.

XERTIGNY. [Vosges.]

XIMENES, CARDINAL. [Cisneros.]

XIMENIA, a genus of *Olacaceæ*, named after Francis Ximenes, a Spanish botanist. Its species are either large shrubs or small trees, and frequently armed with spines. *X. Americana* is distinguished by its perfumed wood, which the Indians employ as a substitute for sandalwood. Its flowers have a strong aromatic odour, like that of cloves. Its acid-sweet aromatic fruits are yellow in colour, oblong in shape, and about an inch in height. *X. elliptica*, a native of Polynesia, yields orange-coloured fruits of a somewhat bitter, but not disagreeable taste, which, before they ripen, emit a powerful odour like that of essence of almonds. The wood of this species is very hard.

XYLOL (Gr. *ξύλον*, 'wood'), a colourless liquid hydrocarbon, aromatic, with considerable refractive power, found amongst the oils contained in crude wood-spirit. Its composition is indicated by the formula $C_{16} H_{10}$.

XYLOPIA, a genus of *Anonaceæ*, whose various species of trees or shrubs are natives of Brazil, the West Indies, and the tropical regions of the New World. They are remarkable for the aromatic properties of their seeds and fruits, and for the bitterness of their wood. The fruit of *X. aromatica*, a South American species, is used by the natives as a substitute for pepper, and sometimes designated Ethiopian pepper. The tough bark of the *X. sencia*, a native of Brazil, and of *X. frutescens*, is manufactured into cordage. *X. glabra* yields the so called bitter-wood of the West Indies, an effectual preservative against the attacks of insects, but so extremely pungent that sugar stored in casks made of this wood becomes uneatable. *X. grandiflora*, indigenous in Brazil, is valued for the febrifugal properties of its carminative seeds. The fruit of all the species of *Xylopia* can be used in place of spice, but if too freely eaten often produces giddiness, mental confusion and even hæmorrhage.

Hall, and was presented by that society to the rectory of Fillingham, in the diocese of Lincoln. In 1365 he resigned the mastership of Baliol for that of Canterbury Hall, then recently founded by Archbishop Islip. In 1368 he exchanged his living of Fillingham for that of Ludgershall, in the archdeaconry of Buckinghamshire. In 1372, having taken his degree of D.D., he read lectures in divinity, in which he exposed the corruptions of the 'mendicant friars.'

In 1375 he was presented to the prebend of Aust, in the collegiate church of Westbury, in the diocese of Worcester, and about the same time to the rectory of Lutterworth, in Leicestershire, where he became an edifying preacher. There are about 300 of his parish sermons still extant.

He now began to speak his sentiments very openly on the subject of the pope and the church, in consequence of which he was more than once summoned before convocations of the clergy; but being supported by John of Gaunt, duke of Lancaster, and Lord Henry Percy, earl marshal, he was dismissed without punishment. After the death of Gregory XI. in 1378, the great schism resulting from the election of two popes enfeebled the papal power in England as elsewhere, and Wycliffe was allowed to continue for some years preaching and writing without further molestation. He also published several works, both in Latin and English, of which by far the most important was his English translation of the whole Bible from the Latin Vulgate. [TYNDALE.] Of this great work we give a short specimen, which the reader may compare with Tyndale's:—

'But in o day of the woke ful eerli thei camen to the graue, and broughten swete smelling spices that thei hadden arayed. And thei founden the stoon turnyd awey fro the graue. And it was don, the while thei weren astonyed in thought of this thing, lo twey men stodun besidis hem in schynyng cloth. And whanne thei dredden and bowiden her semblaunt into erthe, they seiden to hem, what seeken ye him that lyueth with deede men? He is not here; but he is risun: haue ye mind how he spak to you whanne he was yit in Galilee, and seide, for it behoueth mannes sone to be bitaken into the hondis of synful men: and to be crucifyed: and the thridde day to rise agen? And thei bithoughten on his wordis, and thei gedden agen fro the graue: and teelden alle these thingis to the ellevene and to alle othere.'

While Tyndale himself remained at Lutterworth or at Oxford, he had numbers of disciples whom, under the name of poor priests, he kept travelling over the country to disseminate his opinions. His doctrines were occasionally declared by assemblies of divines to be heretical and erroneous, and rigorous measures were taken for their suppression; but Wycliffe himself remained during the greater part of the time unmolested, it is supposed through the influence of the duke of Lancaster.

He spent the latter years of his life at Lutterworth, where his pen was as active as ever. He died in consequence of a paralytic stroke, December 31, 1384. There are Lives of Wycliffe by the Rev. John Lewis, by Dr. Vaughan, and by the Rev. Webbe Le Bas.

WYCOMBE, CHIPPING, or HIGH, a municipal and parliamentary borough and market town, in Buckinghamshire, 29 miles W.N.W. from London by road, and 34 by the Great Western Railway. It is situated in a valley under the Chiltern beechwoods, near the river Wye, or Wycombe, which is lined with several paper and corn mills, and joins the Thames at Wooburn. The town, consisting chiefly of one long street, is clean and well built. The principal structures are All Saints church, of the thirteenth century, in the Norman style, with a tower 100 feet high; two other churches, eight chapels, town-hall, grammar-school, prison, and union. Some business is done in malt and corn, but the staple manufacture of the borough, which has sprung up within the last thirty years, is that of chair-making, from beech, elm, birch, and cherry trees, and which is carried on to such an extent that an average of a chair a minute is made all the year round. By a suitable division of labour, orders are very speedily executed for thousands at a time for any part of the world. The town has a good general trade with the surrounding district for a distance of 10 miles.

The municipal borough is governed by a mayor, four aldermen, and twelve councillors, and has a population of 4221. The parliamentary borough embraces a much larger area, and had a population of 8373 in 1861, which was officially estimated to have increased to 9043 in 1866. Formerly two members were returned to the House of Commons from Wycombe, but it was deprived of one by the Reform Act of 1867.

WYE. [KENT.]

WYE. [RADNORSHIRE; SEVERN AND WYE.]

WYMONDHAM. [NORFOLK.]

WYRE. [LANCASHIRE.]

a mainsail, main-gaff-topsail, foresail, or fore-spencer, as it is sometimes called, fore-gaff-topsail, fore-staysail, and jib; while a square-topsail schooner has a square-topsail and topgallant-sail on the fore-topmast. A yawl is rigged exactly like a cutter, with the addition of a small mizzen mast. It is a very convenient cruising rig, and is becoming common for yachts over 50 tons.

YAKUTSK. [SIBERIA.]

YALDING. [KENT.]

YAM. [DIOSCOREACEÆ.]

YANG-TSE-KIANG ('son of the ocean'), is the Chinese name of one of the largest rivers of Asia. It drains the north-eastern districts of Tibet and the central provinces of China. Its source is in the interior of Asia, about 1850 miles from its mouth in a straight line, and its course is generally east, but it frequently makes very large bends; so that its whole length is computed to amount to about 3600 miles.

The head waters of this river rise between 34° and 35° N. lat., and between 89° and 90° E. long. By the treaty of Tien-tsin it was opened to foreign commerce as far as Hankow, about 700 miles from its mouth, and vessels now trade direct to and from that city and the United Kingdom.

YANINA. [JANINA.]

YANKEE, the popular name for an inhabitant of the United States in England, but in America only applied to a New Englander, seems to be a corruption of the word 'English' (Yengees, Yangees, Yankees) by the North American Indians. It appears to have been first employed derisively about 1775 by the British soldiers in the War of Independence. *Yankee Doodle*, the favourite American air, was originally Nankee Doodle, and the words belonging to it were composed, it is said, in ridicule of Oliver Cromwell. It became popular in America during the revolutionary struggle, and the word 'Nankee,' readily changing into 'Yankee,' it was soon adopted as the national melody. That honour, however, is now given to 'Hail, Columbia.'

YAPOCK (*Cheironectes palmatus*), a marsupial quadruped of the *Didelphidæ* or Opossum family, and the only known species of its genus. It is a native of Brazil and Guiana; about the size of a very large rat; of a brown colour above, and white below; with a sharp muzzle, round and naked ears, a long prehensile tail, webbed feet, cheek pouches, and five molar teeth on each side of the jaw. It feeds on fish and crustaceans, and, unlike the opossum, is wholly aquatic in its habits.

YARD. [STANDARD MEASURES, &c.]

YARKAND or YARKUND. [THIAN-SHAN-NAN-LU.]

YARMOUTH or GREAT YARMOUTH, a seaport, market town, and municipal borough, in Norfolk, is 121 miles N.E. by N. from London by the Great Eastern Railway, and 124 miles by the road. It is situated on the coast of Norfolk, at the junction of the Bure with the Breydon Water, which latter is a lake formed by the confluence of the Yare and Waveney. The Bure having joined the other two rivers at the mouth of the Breydon Water, the united stream, then called the Yare, flows S., nearly parallel to the shore about 2½ miles, and then, turning E., enters the sea, thus forming a peninsula. The town is built on the E. banks of the Bure and the Yare, about half a mile from the seashore. There is an iron drawbridge, 86 feet in length, over the Yare to the suburb of Southtown, or Little Yarmouth, in Suffolk, and connected with Southtown is the village of Gorleston, near the mouth of the river. The Bure also is crossed by a suspension bridge. Yarmouth itself consists chiefly of four streets parallel with the rivers, and connected by nearly 160 alleys called Rows, which intersect them at right angles. The rows are only from 5 to 8 feet wide, and are thus too narrow to be traversed by ordinary wheel carriages; the traffic is, therefore, carried on in what are called Yarmouth carts, which are narrow, have very low wheels, and look like sledges, but are very suitable for the conveyance of heavy goods. The chief buildings in the town are St. Nicholas' cruciform spire church, of the twelfth century, 250 feet long, and 108 feet wide, being one of the largest in England; three others of modern date, including the new church of St. Andrew, and St. John's fishermen's church; seven chapels; Jews' synagogue; town-hall, built in 1723; council-house; custom-house; corn-exchange; public library; house of correction and borough gaol; large military barracks and armoury, the former used as an invalid hospital; militia barracks; new sailors' home, on the Marine Drive; theatre; assembly rooms, and public baths; numerous schools; workhouse, and two hospitals. There are four banks, several breweries, corn mills, and malthouses, and a silk factory in the borough: also timber and ship yards; but shipbuilding has much declined. By the side of the river is a handsome quay, 2000 yards long and 150 feet broad, planted with trees, and considered one of the finest in the kingdom.

The town walls, constructed about the time of Henry III., with ten gates in them, are still in existence, although in part dilapidated.

The harbour, which is formed by the mouth of the Yare, has sufficient water for vessels of 300 tons' burthen to ascend to the quays. It is protected, towards the sea, by two wooden piers; that on the north being 235 yards long, and that on the south 340 yards. There is a handsome marine parade a mile and a quarter in length. In the Yarmouth Roads, outside the river—which are protected as far as possible by means of buoys and floating lights—there is generally safe anchorage in 15 to 18 fathoms, among the surrounding sands, the Scroby, St. Nicholas, Holm, Barber, Cockle, &c., which make a natural harbour of refuge, and are entered by means of the St. Nicholas and Cockle Gats.

The chief trade of Yarmouth is in fishing for herrings and mackerel, and in the curing and exportation of them; about 300 boats, carrying nine to ten hands each, being thus engaged. The herring fishery, which commences in the middle of September and continues till the end of November, gives employment in various ways to about 6000 persons—men, women, and children. The fishing-ground extends upwards of 40 miles to seaward, in from 15 to 20 fathoms of water, along a considerable extent of the coast. In the early part of the season large quantities of fresh herrings are disposed of, and sent far inland by the railways; but the main object is to obtain a sufficient supply for curing. The best and full-grown fish, known as 'bloaters,' are simply salted; the remainder, sold as 'red herrings,' are both salted and smoked. The other fish caught near Yarmouth, including soles, whiting, cod, turbot, and haddock, in great abundance, are generally sent to London daily in a fresh state. In one year 9000 tons of all kinds have been sent away by rail. The town derives some advantage from the supply of provisions to the fishermen and the ships in the harbour. The exports from Yarmouth consist chiefly of grain, malt, and herrings, the latter being sent in large numbers to the countries bordering on the Mediterranean. Timber, coals, wine,

and salt are imported; the consumption of salt being nearly 10,000 tons per annum. The number of vessels registered as belonging to the port in 1867 was 673 (85,650 tons). The entries in 1866 were 1636 (171,931 tons), and the clearances 778 (82,915 tons). The customs revenue received here in 1867 was 25,273*l*. Steam packets run regularly to London, Hull, Goole, &c.

Yarmouth has several public gardens and promenades, and was formerly much frequented as a watering-place, for which its salubrity and firm shelving sea-beach make it very well adapted; but of late years it has been somewhat neglected in favour of newer and more fashionable towns.

The municipal borough—divided into six wards and governed by a mayor, twelve aldermen, and thirty-six councillors—had a population in 1866 of 36,959. The town was formerly a parliamentary borough, and returned two members to the House of Commons from the time of Edward I., but it was disfranchised for bribery in 1867.

Yarmouth has always been an important nursery for seamen, and is mentioned as a fishing place of some note in Domesday Book. On the Denes—a piece of open ground adjoining the town—stands a fine statue of Nelson, 144 feet in height; and several batteries are situated at different parts of the coast. In the immediate neighbourhood lie the ruins of Caistor Castle, and some remains of the Roman station Garianonum.

At a remote period, the ground on which Yarmouth stands formed part of the bed of a great estuary, which extended as far as Norwich. It first became firm and habitable land about the year 1008. Within the last five centuries the mouth of the Yare has been diverted about 4 miles to the south. The shape of the sand-banks beyond the Yarmouth Roads varies slowly from year to year, and often suddenly after great storms.

YARMOUTH. [Isle of Wight.]

YARN is thread spun for weaving cloths of various kinds, and is chiefly noticeable for its general utility, the materials of which it is composed, and the fine texture to which it has been brought. In fact, its value mainly depends upon its uniformity of thickness, and it is to this that the efforts of the best makers are directed. The ordinary division of yarn is into hanks, which vary in dimensions with the material. A hank of linen yarn consists of 300 yards; a measurement surpassed by that of a hank of wool, generally of 840 yards. The greatest success has been achieved from *cotton yarn;* and Messrs. T. Houldsworth & Co., of Manchester, have succeeded in obtaining 700 hanks from a single pound. The highest degree of perfection yet accomplished is, it is believed, the spinning of 10,000 hanks, each 840 yards, from one pound of cotton.

The attention of manufacturers has been directed of late years to a complex process of yarn-spinning, by which the overtwisting of one or more yarns of one or more colours on a ground or body yarn might be effected. The idea comes to us, through French manufacturers, from Austria; and so jealously has the secret been preserved, that our native makers have been compelled to content themselves with an examination of the samples permitted them, and to solve the difficulty of their own accord. Various firms, notably the Messrs. Sanderson, of Galashiels, have attempted the manufacture of the new yarn; and they have succeeded in a manner creditable to the national ingenuity. In finish and rapidity of execution, the yarn now produced by English makers may well compare with Continental products.

We propose to describe the action of one of the most ingenious machines designed for the production of this new material; and for this purpose we select the apparatus for overtwisting exhibited by Messrs. Robert Smith & Son, of Stirling, at the Paris Exhibition of 1867. It is not so rapid in execution as many of its rivals, but excels them all, we think, in brilliancy of finish. (See Plates 1 and 2, 'Yarn-spinning,' prefixed to the present volume. Fig. 1 is a part plan of the mechanism; fig. 2 is a transverse sectional elevation on the line *a a* in fig. 1; fig. 3, another transverse sectional elevation on the line *b b* in fig. 1.)

In fig. 1 the framing, A, is of an open rectangular construction, and in it are fitted bearings for the prime motion shaft, B, on which is situated the system of fast and loose driving pulleys, C, which is driven by the belt, C^1. The shaft, B, carries also the two driving pulleys, D, figs. 1 and 3, over which the belts pass for actuating the long drums, E, from which the several pirns, Q^1, carrying the spotting yarn are driven. The drums, E, are carried in bearings in the framework of the machine fixed to the bracket pieces, F, more particularly seen at fig. 2, to which the bearers, F^1, are fixed for carrying the rails supporting the guides, *f*, for the series of belts, *g*. Along either side of the frame, at a height above the ground convenient for the attendant, the starting rods, G, are situated, to which the starting handles, G, in a right or left hand direction, for the purpose either of starting or stopping the mechanism. The rods, G, are carried in brackets fixed into the framing at convenient distances along its length; and at the end from which the motion is first obtained (which in the present instance is the right-hand end), a stud, *c*, is fixed, to which the cranks, *d*, on the horizontal shaft, H, are coupled, so that as the rods, G, are moved in either a right or left hand direction, the transverse rod, H, is rotated through an angle corresponding to the extent of horizontal movement of these rods, H, and with it the belt guide, I, so that the belt may be shifted on to either the fast or dead pulley as may be required, and the mechanism put in motion or stopped at will. It may be here explained that the machine being double, that is, of similar construction along both its sides, the description preceding and succeeding applies to both sides of the machine. In fig. 2 the pinion, J, on the inner end of the shaft, B, gears into a corresponding spur wheel, J^1, which in turn gears into a pinion, J^2, on the axis of which is carried a smaller pinion, J^3, which next actuates the spur wheel, J^4; and on the same stud is carried, revolving with the wheel, J^4, the bevel pinion, J^5, seen at fig. 3, which in turn actuates the bevel wheel, J^6, and with it the horizontal transverse shaft, K. On either side of the wheel, J^6, is carried the star wheel, L, shown in enlarged detail in fig. 4. As the star wheel revolves, the catch, M, is alternately pressed out from and drawn into the teeth or recesses in the peripheries of the star wheel. When the catches, M, are in the recesses or teeth, the lever, N, draws the conical clutch piece, N^1, into the conical cup or box, N^2, attached to the pinion, O, shown by dotted lines in fig. 3; the tension of the springs, O^1, always pulling the clutch piece, N^1, in the direction of the boxes, N^2, so that when the catch, M, is at the bottom of recess between any two teeth in the star wheel, the tension of the springs, O^1, is sufficient to produce pressure enough to revolve the pinion, O, and actuate the gearing connected therewith. On the central part of the top of the framing is situated the table carrying the pirns, Q, from which the main or centre thread is unwound as the twisting or spotting is produced; the yarn from these pirns is carried up over the rails, R, and downwards, thence through the tube in the centre of the

The breed of cattle is inferior. The poverty of the soil forces the inhabitants—who are generally exceedingly handsome—to be industrious, and the best carpenters, masons, and smiths in Russia are trained in this government. Large numbers of the population are also employed in dressing, spinning, and weaving flax. The fisheries of the lakes, and of the Volga within this district, are important; and give employment to a large number of persons. The exports are Russia leather, sailcloth, duck, linen, cordage, some linseed and linseed oil, salt meat in large quantities, and horse-hair; the imports are corn, brandy, salt, iron, and all kinds of colonial produce, drugs, and manufactures. The Volga, which passes right through the government, affords great facilities for trade and navigation.

Yaroslav, the capital—so named from Yaroslav, the celebrated son of Vladimir the Great, who founded it in 1025—is situated in 57° 50′ N. lat., 39° 30′ E. long., on the right bank of the Volga, 164 miles from Moscow by railway, and contains about 35,000 inhabitants. It is an open town, surrounded with palisades, but has a citadel which is encircled by a rampart. The city stands on an elevated plateau, and its numerous stone houses, fifty churches, and three monasteries, give it a striking appearance. It is, however, ill built, with many narrow streets, though some of them are paved; the principal one, by which the town is entered on coming from St. Petersburg, is broad, lined with trees, and consists of handsome houses. The Russia leather of Yaroslav is highly esteemed, but the linen manufacture, first introduced by Peter the Great, and for which it was also at one time famous, has much declined. There are, however, iron, copper, and bell foundries, tobacco works, extensive cotton factories, and corn mills, and some very large chemical works, chiefly of white lead and minium. The town is the see of an archbishop; and it possesses a college, richly endowed by Prince Demidoff. The trade carried on by means of the Volga is very considerable, and its extensive *gostinoidoor*, or market-place, presents almost as lively an appearance as that of Moscow. *Rostow*, situated on the lake of Nero, one of the most ancient towns in Russia, being mentioned as early as 991, is 6 miles in circuit. It has 6000 inhabitants, and is surrounded by a rampart and a moat. There are some prosperous linen manufactories and chemical works, and the trade of the town is considerable, especially since the opening of the railway between Moscow and Yaroslav, which passes through Rostow. Rostow contains no buildings of importance except an ancient cathedral. A great fair, which begins at the end of February and continues for a month, is attended by at least 40,000 Russians, Armenians, Greeks, and Tartars.

YARROW. [Selkirkshire.]

YAWS, a disease scientifically known as *Framœsia*, in which cutaneous eruptions occur somewhat resembling a raspberry. It seldom attacks Europeans, but negroes are peculiarly liable to it. It is contagious, but only communicated by actual contact of yaw-matter with abraded skin, or by inoculation. Frequently it is carried from one person to another by a fly called the yaw-fly. The disease is seldom attended with fatal consequences.

YAXLEY. [Huntingdonshire.]

YEAST (Anglo-Saxon, *gist*, German, *gëscht*), a substance resulting from the vinous fermentation of such saccharine fluids as contain albuminous matter, rising partly to the surface in the form of a frothy, flocculent, and somewhat viscid matter, insoluble in water and alcohol, and gradually growing putrid in a heated atmosphere. Yeast excites fermentation when added to saccharine and mucilaginous liquids, and is specially employed for this purpose in making bread. Beer yeast possesses this property in an eminent degree. Under the name of *Cerevisiæ fermentum* it figures in the British Pharmacopœia, and is used as a stimulant in cases of low fever and general prostration. The dose is two table-spoonfuls every three hours, in peppermint water or camphor julep. Yeast poultice is recommended for application to putrid and irritable sores. It is composed of six ounces of yeast, fourteen of flour, and six of water. When the water has been heated to 100° the yeast is mixed with it, and the flour afterwards stirred in. Place the mixture near the fire until it rises. The poultice should be removed every six hours.

There are two varieties of yeast—'surface-yeast' and 'sediment-yeast.' The former, which collects on the surface of the fermenting fluid, is propagated by buds [Torula Cerevisiæ]; the latter, formed by deposit, is propagated by spores. The former rises at a temperature of 65° or 70°, and induces a rapid fermentation; the latter at 35° to 45°, and induces a slow and gradual action.

German yeast, of which 5753 tons were imported into Great Britain from Holland, Hamburg, and Germany in 1866, is yeast collected and placed on a cloth to drain, and afterwards pressed until nearly dry.

YEAST PLANT. [Torula Cerevisiæ.]

YEDDO. [Japan; Jeddo.]

YELL. [Shetland Islands.]

YELLOW FEVER, an American disorder of contagious type, attended by yellowness of skin, delirium, suppression of urine, black vomit and ejections, and a small intermittent pulse, occurring generally in low swampy situations, and almost peculiar to tropical and sub-tropical regions. It never appears north of 48° lat., nor above the elevation of 2500 feet above the sea, nor without a higher temperature than 70° Fahr. It is a disease of singular malignancy, proving fatal, on the average, in three out of every five cases. Its ordinary duration is 84 to 100 hours, but death may occur at any period of the attack. The best preventive is quinine taken in daily doses of calomel; upon the best mode of meeting the disease doctors are not agreed. The favourite remedy, however, appears to be '20 grains of calomel added to 24 grains of quinine, afterwards followed by 2 drachms of carbonate of magnesia, and 2 ounces of sulphate of magnesia in 8 ounces of peppermint water. External application of the wet sheet, cupping, leeches, or a blister must also be resorted to.'

Yellow fever is also known as Kendal's fever, Pestilential fever, *Vomito Prieto*, *La Fievre Matelotte*, *Typhus celeritus*, the Black Vomit, and by a variety of other synonyms. It has occasionally been brought to our seaports, as to Swansea in 1866, but has invariably disappeared under the influence of our colder climate.

It was known in America long before the Spanish conquest. It appeared for the first time at Philadelphia in 1699, and ravaged several of the West Indian Islands in 1732, 1739, and 1745. A terrible visitation of it at Philadelphia in 1762, and at New York in August, 1791, swept away the population by hundreds. It desolated the north coast of America in September, 1798; re-appeared at Philadelphia in 1802; and broke out in Spain in September, 1803. Its fury was severely felt at Gibraltar in 1804 and 1814; in the Mauritius, July, 1815, and again in 1867. It visited Cadiz and the isle of St. Leon in September, 1819. A similar, if not an absolutely identical disease, prevails endemically

on the western coast of Africa. In the West Indies it is also endemic; Vera Cruz and Havana being its favourite hotbed. The most fatal season is from April to September.

YELLOW RIVER, called by the Chinese *Hoang-Ho*, is one of the largest rivers in Asia, and the second in magnitude in the Chinese empire. It drains the northern provinces of China proper, a small portion of Mongolia, and the greatest part of Tangut. It originates in the high snow-covered mountains which fill up the greater part of the southern districts of Tangut, a distance of 1290 miles from its mouth in a straight line. Following the course of the stream, which is very winding, its length is about 2480 miles. The area of its basin is 700,000 miles. The river carries an immense amount of sediment to the sea—hence its name.

YEMEN, the south-eastern province or district of the peninsula of Arabia, bounded on the N. by Hedjaz and Nedjed, on the E. by Hadramaut and the Great Arabian Desert, on the W. by the Red Sea, and on the S. by the Gulf of Aden. Its ancient name was *Arabia Felix;* 'Felix' being the erroneous interpretation given to *Yemen* by Ptolemæus, the ancient geographer. The Arabic word, however, simply means 'right;' the land to the right of Mecca.

It has always been rich in myrrh, frankincense, and other odoriferous substances, the 'sweets of Araby the Blest;' and these, in conjunction with coffee, dates, senna, ivory, wax, and goat-skin leather are still its principal products. Its coffee, under the name of Mocha, enjoys the reputation of being the best that is cultivated in any part of the world.

Yemen consists of a central table-land, about 4000 feet above the sea-level, and enjoying a sub-tropical climate, bounded towards the sea by a range of lofty mountains, many of which attain an altitude of 8000 feet, and whose slopes and deep romantic valleys are clothed with luxurious forests, interrupted by breadths of fertile pasturage.

Between the sea and the mountain chain runs a low sandy terrace, called the *Tehama*, varying in breadth from 10 to 30 miles. The coast is frequently rocky and romantic, and girdled by low coral reefs, whose openings form harbours of considerable extent and great security.

The principal ports are Mocha, Aden, a British settlement, very strongly fortified, commanding the entrance to the Red Sea, Hodeida, Shekr, and Abou Arish. The capital is Sanaa, which lies some leagues inland, and differs in no essential feature from other Arabian towns. Loheia, Zebud, and Damar are places of little importance.

The earliest conquerors of Yemen were the Joktanides, and these, about 2400 B.C., were succeeded by the Himyantis, who founded Adea and Saba (or Sabiea), and seem to have been a bold and enterprising race, distinguished by their maritime skill and commercial proclivities. When Christianity obtained a footing in Arabia, the disciples of the new sect were cruelly persecuted by the Himyanti sheikhs, and appealed for help to their fellow Christians in Abyssinia, by whom the Himyantis were conquered in 530. Thenceforward Yemen was ruled by foreign governors; the Abyssinians, about 600, being replaced by the Persians, and the Persians by the Arab followers of Mohammed. The Himyanti chiefs, however, were never wholly subdued, and though they adopted the creed of Islam they still struggled vigorously for independence. After a prolonged contest the Turks were driven out of Yemen in the seventeenth century, and the country is now governed by several independent princes, of whom the most powerful seems to be the imaum of Sanaa.

YENIKALE, STRAIT OF, sometimes called Strait of Kertch, a narrow passage, about 22 miles long, and from 2 to 3 miles wide, connecting the Black Sea with the Sea of Azof, and bounded by the lofty heights of the Caucasus on the east, and the rugged cliffs of the Crimea on the west. Its navigation is very difficult, owing to its frequent shoals and general shallowness. The British and French fleet sailed through this strait on an expedition against Yenikalé and Kertch, which were both bombarded and destroyed, May, 1855. Kertch was the capital of the ancient kingdom of Bosporus.

YEOMAN, YEOMANRY CAVALRY. Of the various derivations proposed for the word yeoman, perhaps *gemein*, or 'common,' is the most probable. A yeoman is at the head of the classes beneath gentlemen. There is a body guard called the yeomen of the king's guard, established by Henry VII. It consists of 100 men habited in the costume of the sixteenth century, and commanded by a captain and other officers. The vulgar name of Beef-eaters, by which they are known, is a corruption of *buffetiers*, from their having been stationed in state banquets at the buffet or sideboard.

During the long war consequent on the French revolution, and whilst this country was threatened with invasion, there was embodied in almost every county a mounted force under the name of Yeomanry Cavalry. There was also a large force of Infantry Yeomanry, but after the peace of 1814 these were disbanded, as were also many of the cavalry. The latter now number about 14,000 men, and are a yearly charge to the country of about 85,000*l.* The horses and uniforms are provided by the men themselves, who receive annually a clothing and contingent allowance of 2*l.* per man, and during the yearly training 2*s.* a day for forage, and a subsistence allowance of 7*s.* a day. By the Mutiny Act they may be embodied for service in any part of Great Britain, in which case they would receive cavalry pay, with forage allowance.

YEOVIL. [SOMERSETSHIRE.]

YESSO or JESSO, the northernmost of the four large islands which compose the empire of Japan. It is separated from the island of Niphon by the Sangar Strait. Length, 350; breadth, 230; area, 62,500 geographical square miles. The chief towns are Matamai and Hakodadi. The latter, which has an excellent harbour, was thrown open to European commerce in 1856.

YEW. [TAXUS.]

YEZD, a city of Western Persia, capital of a province of the same name, situated at the south-western extremity of the stony desert of Khorassan, in lat. 32° 5′ N., long. 54° 50′ E. Its trade is very considerable, as, owing to its position, it forms the principal rendezvous of the caravans from Meshet, Kerman, Herat, and Candahar, and of the merchants of Tehran and Ispahan. The bazaars, therefore, are large and richly stocked; the caravanserais numerous and tolerably well-appointed. The principal manufactures are velvets, silks, woollen fabrics, sugar, and arms. The city is said to be 5 miles in circuit. It is surrounded by a wall and ditch. Population from 40,000 to 60,000.

YOKOHAMA, a seaport in Japan, on the side of the bay of Yeddo, opposite to Kanagawa. It was formerly a fishing village, but the population is now over 20,000, as it has been made the chief treaty port in the empire, and is the place of residence of most of the foreign traders. The commerce is extensive and increasing; and among the public buildings are a large

custom-house, quays, and warehouses, and some residences for the merchants; but the town is completely isolated from the interior by a deep canal. There is, however, a causeway across the marshy ground connecting it with Kanagawa. [JAPAN.]

YONNE, a department in the N.E. of France, which formed part of the old province of Burgundy, is bounded N. by Seine-et-Marne and Aube, E. by Aube and Côte-d'Or, S. by Nièvre, and W. by Loiret. Its greatest length from N.W. to S.E. is 82 miles; its greatest breadth, 53 miles. The area is 2900 square miles; and the population in 1866 was 372,589.

Surface, Rivers, &c.—The department has an undulating surface with rich pasture lands; the highest ground is toward the south-western corner, where the hilly district of *Puisaye* separates the basin of the Loire from that of the Seine. The hills are sometimes barren; but they are usually covered with fruitful vineyards. The climate is temperate, and the air pure and healthy, except in some marshy spots in the west, where fever often prevails. Iron ore is obtained; freestone, sandstone, and lithographic stone, are quarried; red and yellow ochre are also met with. Roman roads and encampments are seen in several places.

The department is drained chiefly by the river from which it is named, and its affluents. The Yonne rises in the department of Nièvre, near Chateau-Chinon; and flows N.N.W. past Coulanges, Auxerre, Joigny, and Sens, a few miles below which it turns W., and enters the department of Seine-et-Marne, where it joins the Seine at Montereau. Its whole course is about 150 miles. The river is navigable from Auxerre, 64 miles above its mouth. Great quantities of squared timber and firewood are floated down the Yonne and its feeders for the supply of Paris.

There are two navigable canals in the department: the Canal de Bourgogne, or Canal de l'Est, which connects the river system of the Seine with that of the Rhône [COTE-D'OR]; and the Canal-du-Nivernais, which leaves the Loire at Decize, in the department of Nièvre, and enters the Yonne at Auxerre. The department is also traversed by the railway from Paris to Lyons, which passes through Sens, Joigny, and Tonnerre.

Products.—The area of Yonne is 1,800,000 acres, of which about 1,150,000 are under the plough. The vineyards cover above 90,000 acres, and the quantity of wine produced is about 20,000,000 gallons annually, two-thirds of which are exported. It is mostly of excellent quality, and is known by the general designation of 'Lower Burgundy wine.' There are extensive forests, inhabited by deer and wild boars; badgers are also met with. The manufactures comprise iron, coarse cottons and woollens, blankets, serges, casks, conserve of grapes, beet-root sugar, leather, glass, tiles, and pottery.

Divisions, Chief Towns, &c.—The department is divided into five arrondissements, which, with their subdivisions and population, are as follows:—

Arrouds.	Cantons.	Communes.	Pop. in 1861.
Auxerre, . .	12	131	118,922
Avallon, . .	5	71	44,672
Joigny, . . .	9	108	97,535
Sens, . . .	6	91	66,647
Tonnerre, . .	5	82	42,529
Total, . .	37	483	370,305

The capital of the arrrondissement of Auxerre, and of the whole department, is AUXERRE. *Chablis*, situated in a district famous for its white wines, lies 9 miles E. from Auxerre, on the left bank of the Serein, and has 2335 inhabitants.

In the arrondissement of Avallon the chief place is *Avallon*, which occupies an ancient site on the right bank of the Cousin, a feeder of the Cure, and has a civil tribunal, a college, and 5533 inhabitants. The town stands at the opening of a valley, shut in by vine-clad hills, 25 miles S.S.E. from Auxerre, and is well built, with wide, clean, and regular streets. It contains several distilleries. Coarse cloth, oak staves, casks, leather, paper, and woollen yarn, are among the industrial products. There is a good trade in corn, wine, timber, wool, horses, and cattle. *Vezelay*, a small village 8 miles W.S.W. of Avallon, the birth-place of Theodore de Beza and of Vauban, was the spot where St. Bernard preached the crusade to the Parliament of Vezelay, in 1145.

Joigny, the chief town of the arrondissement of Joigny, is situated on the slope of a hill above the Yonne, 90 miles by railway S.E. from Paris, 16 N.N.W. from Auxerre, and has civil and commercial tribunals, a college, and 5971 inhabitants. A handsome stone bridge crosses the river, the right bank of which is lined by a high broad quay, closed at either end by iron gates; an old wall, pierced by six gate entrances, surrounds the town on the land side. The ancient name of Joigny was *Joviniacum*. The public buildings include a cathedral, theatre, library of 7000 volumes, hospitals, and barracks. The streets are for the most part narrow, crooked, and so steep that in some places the ascent is facilitated by means of iron hooks fixed into the walls of the houses. The chief industrial products are coarse woollen cloth, linen, casks, brandy, vinegar, tiles, and leather; there is also an active trade in corn, wine, timber, charcoal, bark, hoops, and conserve of grapes. *Villeneuve*, surnamed *le-Roy* and *sur-Yonne*, a well-built town, traversed by a wide regular street, terminated at each end by a handsome gate, is prettily situated on the right bank of the Yonne, 11 miles by railway N.W. from Joigny, and has a population of 4985.

The arrondissement of Sens is named from its capital, and only large town, SENS.

Tonnerre, the most important place in the arrondissement of that name, stands in a fertile wine country, on the slope of a hill above the Armançon, near the Canal-de-Bourgogne, 32 miles by railway S.E. from Joigny, and has a civil tribunal, an agricultural society, a college, and 4789 inhabitants. It is old-looking, but the houses are well built of cut stone, and the streets are regular. The magnificent hospital, founded and richly endowed by Marguerite de Bourgogne, sister-in-law of St. Louis, and the church of St.-Pierre, built on a rock above the town, are the most remarkable buildings. Pottery, leather, nails, iron, agricultural implements, and paper, are the industrial products of Tonnerre and its neighbourhood.

The department forms the see of the archbishop of Sens; it is included in the jurisdiction of the Imperial Court of Paris and Academy of Dijon; and forms a subdivision of the first Military Division, of which Paris is head-quarters. It returns three deputies to the Corps Legislatif. (*Annuaire pour l'An* 1868).

YORK, the capital of Yorkshire, a parliamentary and municipal borough, a county in itself, and the seat of an archbishopric, is situated on the river Ouse, at the junction of the three Ridings into which the county is

divided, 191 miles N. from London. It is a railway terminus of considerable importance, being the meeting point of the Great Northern, Midland, and North Eastern systems. The minster is connected with the railway station by an elegant iron bridge over the Ouse, erected in 1862, at a cost of 35,000*l*. York is one of the most ancient cities in the kingdom, and still retains a venerable aspect of antiquity; its network of narrow streets, which are laid down without any apparent plan or regularity, containing many quaint timbered houses mixed with mansions of more modern date. It has no manufactures, and though its trade has of late revived, this circumstance is chiefly due to its position as a railway centre, the influx of visitors attracted by its remarkable antiquities, and those who, every August, throng to witness its old-established races, which were founded in 1709, and take place on Knavesmire, about 2 miles from the city. Something, too, it owes to its rank as a county town, the assizes being held here, besides the usual local courts of magistracy and judicature. It has numerous good hotels, public and private schools, literary institution, infirmary, gaol, an excellent museum belonging to the Philosophical Society, a mansion-house, a guildhall of stately perpendicular architecture, erected in 1446; a blue-coat school, held in St. Anthony's hall or hospital, a building of the same date and style; a school for the blind, established in 1833, which occupies the palace built by Henry VIII. on the ruins of St. Mary's abbey; an asylum for the insane, and numerous local charities; but these do not call for particular description, and we shall pass on to those 'sights' or 'lions' which attract the attention of every visitor.

These are the Minster, the ruins of St. Mary's abbey, the city walls and gates, and the churches.

The first sacred edifice built on the site of the present Minster was of wood; built by King Edwin, who was baptized within it, on Easter Day, 627, and dedicated to St. Peter. It afterwards gave place to a basilica of stone, commenced by King Edwin and completed by his successor Oswald; repaired by Archbishop Wilfrid in 669; and burnt in 741. Another and more magnificent church was then erected by Archbishop Albert about 770, which remained until destroyed by fire in 1069, during William the Conqueror's devastation of Yorkshire. A new church was then built by Thomas of Bayeux, the first Norman archbishop, which Archbishop Roger reconstructed (1154–81). The south transept which now exists was erected by Archbishop Gray (1215–55); the north transept by the treasurer, John Romanus (1228–1256); the existing nave by his son, Archbishop Romanus (1285–96), as well as the chapter house; the lady chapel and presbytery by Archbishop Thoresby (1352–1373); the choir in 1373–1400. The central and two western towers date from 1405–70.

The present cathedral, therefore, exhibits in its different parts the features of successive periods of English architecture, as will be evident from the following synopsis:—

Saxon (date uncertain)—Inner wall of crypt.

Norman (1070–1100)—Remains at western end of crypt.

Late Norman (1154–81)—Eastern portion of crypt.

Early English (1215–56)—North and south transepts.

Decorated (1285–1345)—Nave and chapter house.

Early Perpendicular (1361–73)—Lady chapel and presbytery.

Perpendicular (1373–1400)—Choir.

Late Perpendicular (1405–70)—Central a western towers.

The cathedral is built of magnesian limeston various Yorkshire quarries. It is a structure of unrivalled grandeur and dignity; the first vie which the stranger obtains impresses him with of sublimity not often produced by any human work; and the impression is not weakened by a examination of its marvellous details.

It is attached to the archbishopric of York, includes the dioceses of Durham, Carlisle, C Ripon, Manchester, and Sodor and Man, and be title of primacy of England (since 1354).

The cathedral (524 feet in length and 250 breadth) is usually entered from the south transept, is pure early English, and divided from the ais enriched buttresses. Here one of the finest views entire building is obtained. 'The great height (97 breadth (93½ feet), and length (223½ feet) of the transept; the majesty of the fine lofty lancets solemn light struggling through their ancient di glass; the great central tower with its unrivalled la which forms the middle distance; and perhaps to extent the unusual point of view (since few cath are entered from the transept), combine to produ impression fully sustaining the great reputation Minster.'

The principal memorials in the south transept are of Archbishop Gray, remarkable for its admirable and execution, and of Archbishop Sewall de Bore

The north transept exhibits many beautiful arc tural details, and some of the lancet windows are with the original early English glass, of great bea colour, and exquisite diapered patterns. Here are Archbishop Greenfield, formerly chancellor of En and Archbishop Vernon Harcourt, who died in The Norman nave is of vast dimensions, and ow its exceeding loftiness produces a powerful effect the spectator. Looking westward, the principal f is the grand western window, blazoned with figures of mitred prelates, and shedding a 'dim re light' on the pavement beneath. It is filled with t tracery of such delicate and refined work tha wonders the stone could ever have become so under the artist's hand. It has justly been pronc the finest decorated window in the kingdom, an bably has few equals throughout Europe. The aisles are 30 feet wide: the aisle doors are surmo by some quaint sculptures. Here were interred bishop Roger, Archbishop Melton, and St. Willi York, but their monuments have disappeared. 1863 the nave has been used for congregationa poses, and is lighted with gas in a very pictu manner.

The chapter house is the most beautiful struct its kind in England, and a splendid specimen architecture of the early part of the fourteenth ce In form it is octagonal; its windows are filled wit stained glass of the mellowest hues; the carving, leaves, maple, oak, and other foliage, is touched wonderful tenderness and truth; and sculptu grotesque heads and figures, scarcely inferior in sp those of Grinling Gibbons, present a peculiarly luxu and varied effect. The roof was restored in 1845 east window is modern, and the work of Messrs. Ba of York.

We now come to the choir, which is one of great nificence, and lighted by numerous exquisitely p windows, especially by the great eastern windo

largest in England (78 feet by 33 feet), and a perfect 'wall of glass,' not less remarkable in colour than in design. The height of the choir is 102 feet; its width 99½ feet. Its prevailing characteristic is majesty, and the impression produced by the ensemble is not weakened by any of the parts. Everywhere the architect has laboured conscientiously, so that even the details are marked by an unusual air of grandeur. The ancient woodwork was destroyed by fire in 1829, as well as the original stone altar screen, but all has been restored with commendable fidelity. The altar occupies the site of the once celebrated shrine of St. William, who was canonized in 1227.

The aisles of the choir, and the presbytery, or retro-choir, are also distinguished by architectural features of great excellence. The principal monuments are those of William de Halfield, second son of Edward III., a finely sculptured effigy: Archbishop Savage, noted for his love of field sports and building; Charles Howard, earl of Carlisle; Archbishop Sterne, who, as the chaplain of Laud, attended him on the scaffold; Archbishop Scrope, beheaded for joining in the conspiracy of the northern barons against Henry IV.; Archbishop Markham, Archbishop Frewen, Archbishop Sharpe, Archbishop Rotherham, Archbishop Tobias Matthew, Archbishop Bowet, famed for his hospitable virtues; Archbishop Musgrave, who died in 1860; Wentworth, earl of Strafford, son of the great earl; Archbishop Lamplugh, Archbishop Matthew Hutton, Archbishop Dolben; and certain British officers and privates who fell in the Crimean war. The latter were executed by Skidmore & Hardman, from the designs of G. G. Scott.

The crypt, laid open since 1829, is of late Norman character, with massive piers, having four small shafts placed round each. It was undoubtedly the work of Archbishop Roger (1154–81).

The central tower rests upon four great arches, which, with their huge piers and foliated capitals, are truly magnificent. The vault of the lantern is 180 feet from the pavement.

The remaining portions of this noble minster which best deserve examination are the rood or choir screen, constructed in 1475–1505, and consisting of fifteen richly carved compartments; the record room, vestry, and treasury, where are preserved some antiquities of very great interest; the library, containing about 8000 volumes; and the glorious west front, which has recently been pronounced, by a competent authority, 'more architecturally perfect, as a composition and in its details, than that of any other English cathedral.' It consists of a centre, flanked by two lofty towers, forming the terminations of the aisles, and it is partly early decorated, partly perpendicular in style. The south-west tower dates from 1450; the north-west tower about thirty years later. They rise to an elevation of 200 feet above the ground. The central doorway is distinguished by its profuse enrichment. In the north-west tower was hung, in 1845, a monster bell, weighing 10 tons 15 cwts., and cast by Messrs. Mears, of London, at a cost of 2000*l.*, defrayed by public subscription.

The churches of York are numerous, and with very few exceptions interesting. Before the Reformation there were forty-five; at present there are twenty-four. Many of them are celebrated for their rich stained glass, but none are of great size. The most important are: All Saints', North Street; St. Denis', Walmgate; Holy Trinity, Goodram Gate; St. Martin-le-Grand, Coney Street; St. Michael-le-Belfry, in the Minster Yard; St. Margaret, Walmgate; St. Mary, Bishop Hill; and St. Mary, Castlegate. St. Michael is a perpendicular building, erected in 1525-36; Holy Trinity, partly decorated, partly perpendicular; St Denis consists of chancel and aisles, with some remarkable Norman features; St. Martin-le-Grand, late perpendicular; St. Margaret, Walmgate, has a very fine Norman porch and doorway; St. Mary, Bishop Hill, a noble massive tower of great antiquity; and St. Mary, Castlegate, a stately perpendicular tower and spire. All Saints' is a noteworthy perpendicular building, with some curious old buildings. In St. Crux are buried Percy, earl of Northumberland, beheaded in 1572; and Sir Thomas Herbert, the faithful attendant and chronicler of Charles I. Christ Church, Collier Gate, is supposed to occupy the site of the first Christian church built in York. That of St. Helen's on the Walls, abandoned at the Reformation, is pointed out near Monk Bar. In a vault beneath was found the supposed tomb of Constantius Chlorus, the father of Constantine the Great.

The remains of the ancient city walls, and especially of the Mullangotin Tower, which is partly Norman, and consists in plan of ten sides of a nearly regular thirteen-sided figure, forming nine very obtuse angles, will attract the attention of the archæologist. The walls, which have been rebuilt and repaired at various periods, and as lately as 1833, are perfect nearly throughout their whole extent. The gates, called *Bars*, are five in number, and date from the time of Edward III. They are: Micklegate Bar, the largest and most interesting; Bootham Bar; Monk Bar; Fishgate Bar; and Walmgate Bar.

On a tongue of land, formed by the junction of the Ouse and the Foss, stands the ancient castle, founded by William the Conqueror; besieged and captured by the Danes and Northumbrians in 1069; the scene of the terrible massacre of the Jews in 1190, when 500 perished in the keep; beleaguered by the Parliamentarians in 1644; and soon afterwards dismantled. It has ever since served as the county prison. Within an area of four acres, inclosed by a massive wall 1100 yards in circuit and 35 feet high, finished in 1836, stand the county gaol, the county courts, and a fragment of the old keep, Edwardian in style, and now known as Clifford's Tower.

St. Mary's Abbey was one of the earliest monastic establishments founded in Yorkshire after the Conquest. It belonged to the Benedictines, and accumulated great wealth—its annual rental at the time of the Dissolution (in 1540) amounting to 1650*l.* The abbot of St. Mary's was mitred, and sat in Parliament. The remains of the monastic buildings are held from the crown by the Yorkshire Philosophical Society, and are very carefully protected. The most interesting portion is the abbey church, an early English structure; and the ancient *hospitium*, or guest-hall, of the monastery, belonging to the fourteenth and fifteenth centuries. Besides the Benedictine, York formerly contained a Dominican, a Franciscan, a Carmelite, and an Augustinian monastery, a Gilbertine priory, seventeen chapels, and sixteen hospitals. Of the latter, St. Leonard's was founded by Athelstane, re-founded by the Conqueror, and rebuilt by Stephen. It accommodated a warden, thirteen brethren, eight sisters, twenty-six bedesmen, and eight servitors, and its rental amounted to 362*l.* The chief remains are those of the ambulatory or cloister, and of the chapel of the infirmary.

York contains a Roman Catholic cathedral, fourteen denominational chapels, and several excellent educational institutions; especially the York proprietary school, the York and Ripon diocesan training school for masters,

St. Peter's school (founded in 1557), and Archbishop Horgate's free school (founded in the reign of Henry VIII.). There are some manufactures of combs, glass, leathern gloves, flax, and linen, but none of importance.

The corporation includes a lord mayor (the dignity having been conferred by Richard II.), eleven aldermen, and thirty-six councillors. The population of the city, which returns two members to Parliament, was, in 1866, 48,128, of whom 4277 were registered electors. Among the 'eminent natives' have been: Sir Thomas Herbert; Guy Faux (born 1570); Bishop Porteous; Lindley Murray, the grammarian; Thomas Gent, the printer; John Flaxman, the sculptor; and William Etty, the painter.

York appears to have been an ancient British city of some importance, and one of the chief towns of the Brigantes, which the Romans probably captured and colonized about A.D. 79, during the second campaign of Agricola. It then assumed the name of *Eboracum*, and rose to a position of extraordinary wealth and influence. Here Hadrian lived, and here, February 4, 210, the great Emperor Severus died. It afterwards became the imperial residence of Constantius Chlorus, whose son, Constantine the Great, was perhaps born at York, and at all events was proclaimed emperor here. It continued to be the seat of the imperial power for many years, and was adorned by the Roman prefects with buildings of great splendour. Under the Saxons it retained much of its prosperity, and during the eighth century was one of the chief places of education in Europe. Alcuin, the friend and teacher of Charlemagne, was once its 'magister scholarum.' Here in 966, Egbert, first king of all England, held the Witenagemot. Early in the tenth century it had become colonized by Danes, and was the great depot of the Danish trade. It opposed a steadfast resistance to William I. in 1068, and a Norman garrison of 3000 men was overcome and slain by its warlike citizens in the following year; an achievement which the Conqueror revenged by laying waste the whole country between the Humber and the Tyne.

The first English Parliament was held at York by Henry II. in 1160; and the city was constantly visited by the Plantagenet kings, who frequently held their councils and courts of justice within its walls. Here on Christmas day, 1251, Alexander of Scotland was married to Margaret, daughter of Henry III.; and in 1329, Edward III. to Philippa of Hainault. Here Edward IV. was crowned in 1464, and Richard III. in 1483. It was besieged by the Parliamentarians, under Fairfax and Manchester, in 1643, but relieved by the approach of Prince Rupert and the Royalists. Soon afterwards was fought the decisive battle of Marston Moor, and the city surrendered to the Parliament, July 16, 1644. Here, to pass over two centuries at a bound, the British Association for the Advancement of Science was organized, and held its first meeting, September 27, 1831.

The dukedom of York has been held by many of our English princes. It was first created by Edward III. in favour of his fifth son, Edmund, in August, 1385; was afterwards held by his son Edward, 1406-15; Richard, nephew of Edward, 1415–60; Edward, afterwards Edward IV., 1460–74; Richard, his second son, 1474–83; Henry Tudor (Henry VIII.), 1494; Charles Stuart (Charles I.), 1605; James Stuart (James II.), 1643; Ernest, brother of George I., 1716–28; Edward, brother of George III., 1760–67; and Frederick, son of George III., 1784–1827.

The archbishopric is said to have been founde... King Lucius about 180. It was revived by Pope ...gory in 625. Its present income is 10,000*l.* per a... and its occupant Dr. William Thomson, translated ... the see of Gloucester in 1862. (Hargrave, *Hist... York;* Wellbeloved, *Eboracum;* Drake, *Ebor...* Browne, *History of the Metropolitan Church of ...* Walter White, *A Month in Yorkshire;* and M... *Handbook to Yorkshire*, 1867.)

YORKSHIRE, a maritime county in the nort... part of England, is bounded N.E. and E. by the N... Sea; S. by the estuary of the Humber and the ... Trent, which separates it from Lincolnshire, Nottingha... shire, and Derbyshire; S.W. by a small part of Ches... W. by Lancashire; N.W. by Westmoreland; and N.... the river Tees, which divides it from Durham. T... greatest length E. to W. is about 100 miles; the greate... width N. to S. is about 92 miles. It is comprehend... between 53° 18′ and 54° 40′ N. lat., and between abo... 0° 10′ E. long. and 2° 40′ W. long. It is as large as a... other two counties in Great Britain; about the size ... the entire Peloponnesus; very nearly half as large ... modern Belgium; and half as large as Holland. T... area and population are as follows:—

	Area in acres.	Population in 1861.
North Riding, . . .	1,350,121	245,154
West Riding, . . .	1,709,307	1,507,796
East Riding, . . .	768,419	240,227
City and Ainsty of the City of York, . .	2,720	45,385
Total, . . .	3,830,567	2,038,562

Coast.—From the mouth of the Tees to Flamboro... Head the coast of Yorkshire, which is the boldest a... finest in England, with the exception of that of Dev... and Cornwall, extends E.S.E. and S.E., and is genera... high and precipitous. The distance, following the sw... of the sea-line, is about 60 miles, and the only harb... of importance is that of Whitby. Huntcliff Nab i... bold headland, 360 feet high; Boulby cliff, 660 feet, t... loftiest precipice on the English coast. Staithes is ... quaint old fishing village, and Runswick Bay is remar... able for its caves. S. of Whitby lies Robin Hood's Ba... a locality of singularly picturesque character, terminat... by a high peak, 585 feet above the sea. The scen... in the neighbourhood of Scarborough is scarcely l... romantic, and the grand curve of Filey Bay presen... great attractions for the artist. From Flamboro... Head, which is a lofty cliff of chalk protruding far in... the sea, and tunnelled by some splendid caverns. T... coast turns to the W., and sweeping round to the S.S.... forms Bridlington Bay, in which is the small harbo... of Bridlington Quay. The sands are here very firm a... level. The coast then, with a few cliffs at intervals... decreases in elevation as it extends to Spurn Hea... which terminates on the E. the alluvial district of Ho... derness. Dimlington hill, 146 feet, is the highest po... between Flamborough and Spurn Head; the latter, ... mass of pebbles and sand, movable by wind and tid... but so balanced by the forces which assail it from riv... and sea, that it has long supported Smeaton's lig... houses, built in 1776; that on the highest point is ... feet high, the lower one, 50 feet. The coast here ... undergoing extensive alterations. The once famous p... of Ravenspurne, where Bolingbroke landed in 1399, h... entirely disappeared.

Surface.—The most striking feature in the configu... ation of the surface of Yorkshire is the great vall...

drained by the Ouse and its tributaries—the Ouse, and the Trent from Lincolnshire, forming the estuary of the Humber. If through the city of York a line be drawn to the N.N.W. and S.S.E., it will divide equally a wide continuous vale, rarely elevated more than 100 feet above the sea. Were the general level of the land lowered to this extent, this vale would form a sea-channel, bordered by the cliffs of an island on the east, and more slowly rising shores on the west. The district assumes a somewhat mountainous character along nearly all the western border of Yorkshire. The eastern region is also mountainous in its northern portion, and in the southern rises into a curved range of chalk hills called the Wolds. These consist of an insulated range of chalk, which extends in the form of a crescent more than 30 miles, from Flamborough Head almost to the banks of the Humber, about 8 or 10 miles above Hull, separating the basin of the Hull from that of the Derwent. Many feeders of these rivers rise on the southern slope; those of the Hull on the concave side of the crescent, those of the Derwent on the convex, while the northern part of the Wolds is drained by a stream which falls into the sea at Bridlington Quay.

North of Flamborough Head the basin of the Humber extends to the coast, for the source of the Hartford, an affluent of the Derwent, is as near the shore at Filey Bay as that of the Hull at Bridlington, nor is the head of the Derwent itself more than 2 or 3 miles distant from Robin Hood's Bay, which forms the north-eastern extremity of the basin.

The oolitic hills extending from Robin Hood's Bay inland, under the designation of the Eastern Moorlands, form part of the northern boundary of the basin of the Ouse and Humber, and separate it from that of the Esk, which falls into the sea at Whitby, and from that of the Tees, which divides Yorkshire from Durham. The Eastern Moorlands are a wild and extensive tract, about 20 miles long and 14 miles wide, the surface of the more elevated parts being covered with large freestones, extensive morasses, and peat bogs. They are also clothed in many places with thick deep heather, and the moorland ridges are divided by long winding dales, each watered by its own bright brook and marked by a long line of rich green pasture. The most important of these are Bilsdale, Bransdale, Farndale, Rhosdale, and Newtondale. Their leading features have been graphically described by Charlotte Brontë in her novel of 'Shirley.' Some of the mountains are nearly 2000 feet high. A branch of the Eastern Moorlands, extending in a S.E. direction from the western extremity of the range, divides the basin of the Derwent from that of the Swale and the Ouse.

From the western end of the Eastern Moorlands the basin of the Ouse is bounded, still on the north side, by a lateral branch or offset of the great Pennine chain, which separates this basin from those of the Tees and the Eden. The hills constituting it rise above the valley which divides them from the Eastern Moorlands near Great Smeaton, between Northallerton and Darlington, and extend westward, increasing in height as they proceed to their junction with the main Pennine chain near the mountain called the Nine Standards, in Westmoreland. That part of the range which occupies the N.W. extremity of the West Riding forms the western portion of the wild district of Craven, and comprises, among its more elevated summits, Ingleborough, or 'the hill of the Angles' (2373 feet high) and Penyghent (2273 feet high).

The north-western section of the basin of the Ouse is formed by the Pennine mountains, which separate it from the basins of the Eden, as well as from those of the Lancashire rivers, the Lune, the Ribble, and the Mersey. The branches which the great chain throws off towards the east, constituting the Western Moorlands, containing some of the most picturesque dales and finest rock-scenery in England, are separated from each other by long, narrow, but romantic valleys, in which the Swale, the Ure, the Wharfe, the Aire, the Calder, and the Don, all directly or indirectly tributaries of the Ouse, have their course. This district is remarkable for the wild grandeur of its landscapes. The neighbourhood of Rokeby has been painted with equal force and truth by Sir Walter Scott; and the district of Richmond, Wensleydale, Garsdale, Nidderdale, Upper and Lower Wharfdale, Bolton Priory, Settle, Ribblesdale, Ingleton, and Craven, with their stalactite caves and leaping waterfalls, their heather-clad hills and bold rocky scaurs, are not less worthy of song and pencil. The southern end of the Pennine chain forms for many miles the boundary between Yorkshire and Derbyshire. The general elevation of the Western is greater than that of the Eastern Moorlands, the mountains, as they advance towards the great Pennine ridge, attaining an elevation of 2500 to 2600 feet.

The valley of the Ouse, or the Vale of York, whose eastern and western boundaries have already been described, commences very near the river Tees, and, occupying the centre of the county, extends S. and S.E. to the Humber. Its highest elevation is about 100 feet above the sea. The northern section has a gentle slope, with the level broken by several bold swells; but south of the city of York the surface sinks into a perfect flat, and is in several districts marshy, especially along the course of the Ouse. That portion of the valley spreading immediately about the lower part of this river, and lying between it and the Wolds which separate the valley from the Holderness district, is called the Levels; and though fertile and pretty thickly inhabited, it presents no interesting features. Farther south, towards Sheffield, and on the western slope, the surface is finely diversified by the green hills which gradually rise towards the mountainous district.

Geology.—The great central vale of Yorkshire consists for the most part of extensive breadths of fine sediments, accumulations of gravel, and other diluvial deposits.

The Wolds are composed of chalk, which is usually a harder rock than that of the south of England, and the nodular flints that it contains are scattered through a great part of its thickness. It is rich in sponges, belemnites, echidna, apiscrinites, and marsupites. The lower sandstone, shale, and coal, constitute the Eastern Moorlands. The latter, in this great mass of arenaceous and argillaceous deposits, is thick enough to be worked on the moors W. of Whitby and N. of Helmsley. Over the coal lies a bed of sandstone, and below it one of shale. Upper lias shale, called also alum shale, is manufactured into alum near Whitby, Lofthouse, and Gainsborough; it is found in considerable quantities in the Whitby cliffs. The new red sandstone, which lies on the western side of the vale of York, in an irregularly undulating tract of dry land, accumulates especially about Ripon and Boroughbridge. The magnesian limestone extends in a range of low tabular hills from near Masham, by Knaresborough, Pontefract, Broadsworth, and Roche Abbey. The lower red sandstone, or Pontefract rock, is usually a mass of yellowish sands, of the greatest excellence for the use of the metal-founder in the construction of his moulds.

earth. In the East Riding the Wolds are chiefly used for sheep pasturage. The soil is a light loam, with a mixture of gravel. In the flat district of Holderness occurs a strong alluvial deposit. The agriculture is generally of an improved description, but includes almost every variety of practice. The cattle and horses are mostly of superior kinds, and the breed of pigs is of well-known excellence. The following table, showing the 'Agricultural Statistics' of the county for 1866, is compiled from the most recent parliamentary return:—

Divisions.	Total acres under cultivation.	Wheat.	Barley.	Oats.	Potatoes.	Turnips and Swedes.	Vetches &c.	Hops	Clover and Grass.	Permanent Pasture.	Bare or Fallow.	Ordinary Stock of Cattle.	Sheep.
E. Riding, including York city, .	612,084	116,115	44,472	75,061	10,222	71,101	12,372	20	81,716	141,020	23,192	71,501	416,853
North Riding, . .	760,778	71,683	56,911	73,989	10,663	60,245	7,898	16	68,138	351,626	36,453	125,750	462,038
West Riding, . .	1,094,152	102,995	69,168	59,806	26,850	62,395	19,224	6	90,641	613,850	24,621	196,751	500,196
Total—Yorkshire,	2,467,014	290,793	170,551	208,856	47,735	193,741	39,494	42	240,495	1,106,496	84,266	394,002	1,379,087

Manufactures.—The manufactures of Yorkshire are of national importance. Those of woollen cloths, at Leeds, Bradford, Halifax, Wakefield, and Huddersfield, have been brought to such a degree of perfection as to surpass the woollens of the West of England. The making of worsted fabrics was introduced into the county about the middle of the seventeenth century, and Bradford is now the great worsted mart of England. The iron works are very extensive. Sheffield is the great seat of the manufacture of cutlery of all kinds, as well as of tools and plated goods. Linens are extensively produced at Leeds and Barnsley, blanketings at Dewsbury, cottons in the Todmorden valley, and glass and iron at Rotherham. The resources of the county also include lead-mines in Swalesdale and Nidderdale; jet, which is worked extensively at Whitby; alum, building stones, and black and gray marble. Hull, Whitby, and Goole, are the chief ports.

Divisions and Towns.—Yorkshire is divided into the North Riding, the East Riding, the West Riding (the word *Riding* is a corruption of the Saxon trithing, or thirding), and the Ainsty of the city of York. The North Riding is divided into ten wapentakes; the East into six wapentakes, including the Ainsty of York; and the West into nine wapentakes. The county is partly in the diocese of York and partly in that of Ripon. It is in the Northern Circuit, and the assizes are held at York. By the Reform Act of 1867 the West Riding was separated into three divisions, each returning two members to Parliament. Each of the other Ridings returns two members; besides which the borough of Leeds returns three; those of Beverley, Bradford, Halifax, Hull, Pontefract, Scarborough, Sheffield, and York, two each; and Dewsbury, Huddersfield, Knaresborough, Malton, Middlesborough, Northallerton, Richmond, Ripon, Thirsk, Whitby, and Wakefield, return one member each; total, forty.

The following are the principal towns, with the population of each in 1861:—

Barnsley. [BARNSLEY.]

Bawtry, a market town, 8 miles S.E. from Doncaster. The principal street, which is wide, contains many well-built houses, with a station on the Great Northern Railway. The church has some Norman portions; and there is a hospital with a chapel, founded by the Morton family. Population, 1011.

Beverley. [BEVERLEY.]

Bingley, a market town, 37 miles W.S.W. from York, is situated on an eminence between the river Aire on the S W. and the Leeds and Liverpool Canal on the N.E., the latter passing close to the town. It is an important station on the Midland Railway, which is carried under part of the town in an arched tunnel of masonry. Bingley consists principally of one long street, and contains a perpendicular church, three places of worship for dissenters, and a well-endowed grammar-school. The worsted manufacture and cotton-spinning are carried on to a considerable extent in the town and neighbourhood, having been introduced about 1806. There are now more than twenty large worsted factories in the parish. Population of town, 5238; of parish, 15,367.

Bradford. [BRADFORD.]

Bridlington, formerly called *Brillinton*, a market town and municipal borough, 40 miles N.E. from York, with a station on the North-Eastern Railway, is situated about a mile from the sea-shore, and 7 or 8 miles from Flamborough Head. On the coast has sprung up of late years a popular watering-place, *Bridlington Quay*, whose fine level sands afford great facilities for sea-bathing. The harbour is formed by two massive piers; the southern one was built in 1849, at an outlay of 40,000*l.* A suite of public rooms close at hand cost 8000*l.* About half a mile N.W. rises a chalybeate spring similar in properties to that of Scarborough, but less powerful. The bay commands some noble marine prospects, and affords the best anchorage on the coast. Here Queen Henrietta Maria landed on the 20th February, 1643. The old town grew up about an Augustinian priory, founded early in the reign of Henry I., which became one of the richest religious houses in the county, and whose annual income at the dissolution was estimated at 682*l.* Peter of Langtoft, one of our early English chroniclers, was a canon here. The ruins are considerable, and the nave of the priory church is now used as the parish church of Bridlington. William of Newburgh, the chronicler, and William Kent, the landscape gardener, were natives of Bridlington. Population of the town, 5775; of the parish, 6833.

Dewsbury, a market town, municipal and parliamentary borough, and the centre of a great branch of the woollen manufacture, 35 miles S.W. from York, is situated on the N. bank of the Calder, and has by the Aire and Calder Canal extensive water communication, while its position on the North-Western Railway connects it with an important commercial district. There are coal mines in the neighbourhood, and the town has large establishments for the manufacture of blankets, woollen cloths, carpets, worsted yarn, shoddy, druggets, iron-founding, &c. It contains a new court-house; a parish church, rebuilt in 1767, and again in 1823, so that it now possesses few relics of the original early English structure; another church; and several places of worship for dissenters. A weekly market is held in the cloth-hall, which was built in 1837. By the Reform Act of 1867 Dewsbury was formed into a parliamentary borough returning one member. Population within the

municipal boundaries, 18,148; of the entire parish, 34,988. The parliamentary limits include the townships of Dewsbury, Batley, and Soothill, with a total population, in 1861, of 38,559.

Doncaster, a market town and municipal borough, 37 miles S. by W. from York, and 156¼ miles from London by the Great Northern Railway, which is connected with the Midland and South Yorkshire lines, and has its carriage factories, engine works, and other establishments planted here, is one of the cleanest and pleasantest towns in Yorkshire. It is situated on the west bank of the Don, and occupies the site of the Roman *Danum*, some remains of which are from time to time discovered. The Northumbrian kings afterwards resided in it, and from its position on the Great North Road it was frequently exposed to the 'storms of battle.' Malcolm of Scotland did homage here in 1157 to Henry II. In the rebellion of 1470 against Edward IV., two of the leaders were beheaded in the market-place. It was the scene of the pacification in 1536 which terminated the great rising known as the 'Pilgrimage of Grace;' and in the Civil War was several times visited by Charles I. and the parliamentary generals. Its celebrated races were established about the beginning of the eighteenth century, but acquired no distinction until Colonel St. Leger founded the Leger Stakes in 1778. They take place annually in September, and last four days. The race course is about a mile from the town. The town-hall was erected in 1744, and improved in 1800. St. George's, the parish church, built in 1855, is one of the stateliest religious edifices in Great Britain. The tower is 170 feet high, and is the only portion preserved of the ancient church, destroyed by fire in February, 1853. St. James' is also modern, erected principally to accommodate the railway 'colony,' which numbers about 4000. Christ church, at the south end of the town, was built in 1829. Doncaster has no manufactures, but its trade is considerable. It contains a well-built mansion-house, guild-hall, covered market, theatre, infirmary, grammar-school, denominational places of worship, and several local charities. The municipal borough is divided into three wards, and governed by six aldermen (one of whom is mayor) and eighteen councillors. The first power-loom, invented by Cartwright, was established here at the inventor's own expense, in 1786. The machinery was at first moved by a bull. Population of the borough, 16,406; of the parish, 17,632.

Goole, a market town and port, 30 miles S.W. from Hull, is situated on the S. bank of the river Ouse, at the mouth of the Don, and connected with the Great Northern Railway by a branch line from Knottingley Junction. It is also the terminus of the Goole and Knottingley Canal, 18 miles in length. Of late Goole has become a busy and important harbour, a pier and docks having been constructed by the Aire and Calder Navigation Company. One of the docks, finished in 1838, can accommodate vessels of 300 tons. The new dock for steamers is 200 feet long and 58 feet broad. There are also a timber pond, and large warehouses. Steamers ply regularly between Goole and Hull, Antwerp, Dunkirk, and Rotterdam. The number of vessels registered as belonging to the port in 1867 was 534 (33,970 tons). The entries in 1866 were 1941 (186,581 tons), and the clearances 1789 (168,161 tons). The customs revenue received in 1867 was 47,427*l*. Iron, cloth, and building stone, are the chief exports; fruit and vegetables the principal imports. Shipbuilding, boatbuilding, iron-founding, and sugar-refining, are among the staple resources of the town. The church is of modern construction, with a lofty spire. Popu tion, 5850.

Great Driffield, a market town, 30 miles E. by from York, with a station on the North-Eastern R way, is situated on a small stream, one of the sour of the river Hull, which is made navigable to Hull, conveys considerable quantities of corn and farm produ The name of the town is derived from *Deor* or *Dei* and *feld;* that is, the field in the midst of the gr woods of Deira. There is a handsome corn-exchan and the market is one of the best in the East Ridi The church is ancient, but uninteresting. In the neig bourhood are numerous remains of British and Sax origin. Population of the township, 4405.

Guisbrough, a market town, and one of the centr of the iron trade, is situated amid much pleasant scener 8½ miles from the Stokesley station on the Ingle Railway. About 6 miles N. is the small harbour Redcar, at the mouth of the Tees. The town w formerly celebrated for its alum works, originated Sir Thomas Chaloner, in the reign of Mary, but i present prosperity depends upon its ironstone quarrie The chalybeate spa is now disused. The ruins of a Augustinian priory, founded in 1120–1129, by Robe de Brus, consisting chiefly of the E. end of the churc and of the Transition-Norman gatehouse, possess gre interest for the archæologist. The parish church belong to the perpendicular period. An altar tomb in the porc is supposed to be the cenotaph of Robert Bruce, king o Scotland. Population of town, 3794; of parish, 4615.

Halifax. [HALIFAX.]

Harrogate, the most important inland watering place in the north of England, 22 miles west from York, with a station on the North-Eastern Railway, consists of two principal sections, High and Low Harrogate, and is situated at the head of a ridge of millstone grit, which slopes considerably on the E., W., and N. The general elevation is about 300 feet; the surrounding country pleasant, and covered with young plantations; and the climate dry and bracing. Its Spa has been famous since its discovery by Sir W. Slingsby, about 1596, but the prosperity of the town dates chiefly from the development of the railway system in 1840. There are now several handsome hotels, numerous excellent lodging houses, large and well-fitted baths (the Victoria, Montpellier, Starbeck, and Harlow Car), a splendid promenade and pump-room (the Royal Cheltenham), reading-rooms, bazaars, and the usual *agrémens* of a fashionable watering place. St. John's church, Brit was built in 1856 from the designs of G. G. Scott. Harlow Tower, on Harlow Hill, is 100 feet high. From its summit may be seen Lincoln Cathedral and the Derbyshire Peak. There are about twenty-five springs available for public use, all sulphurous and chalybeate, and nearly all situated in Low Harrogate. Two pure chalybeates occur at High Harrogate on the Common. The Montpellier Gardens are a favourite place of resort, and very agreeably laid out. Population, 4737.

Howden, a market town, 21 miles S.S.E. from York, is situated about a mile from the N. bank of the Ouse. It has a station half a mile distant on the Great Northern Railway. Its parish church, formerly collegiate, is an interesting and beautiful structure, chiefly in the decorated style, with a perpendicular tower, erected in 1403, and fully 130 feet in height. There are also some denominational chapels, a grammar-school, a market-house, and other public buildings. The town is celebrated for its horse fair, said to be the largest in the world, and held every September, for six days, towards the end of the month.

Roger de Hoveden, the historian, and Baron Ward, who rose from a stable boy to become the favourite minister of the duke of Parma, were natives of this place. Population of the town, 2375; of the parish, 5209.

Huddersfield. [HUDDERSFIELD.]

Hull. [HULL.]

Keighley, a market town, 30 miles W.S.W. from York, stands in a deep valley at the junction of two streams, which fall into the Aire about a mile to the N.E., where also the Leeds and Liverpool Canal passes. It has a station on the Midland Railway, 17¼ miles from Leeds. The town, which is rapidly being transformed into a populous and very prosperous place, is irregularly built, mostly of stone, and contains a court-house, and an ancient church, rebuilt in 1847. Woollen and worsted manufactures were early introduced here. The first cotton mill was erected in 1780. There are now more than forty cotton and worsted mills in and about the town. *Haworth*, the home of Charlotte Brontë, the author of 'Jane Eyre,' who, with most of her family, lies buried in its churchyard, is 4 miles distant. Graphic sketches of this neighbourhood will be found in Charlotte Brontë's works, and in Mrs. Gaskell's 'Life' of the great novelist. Population of the town of Keighley, 15,005; of the parish, 18,819.

Knaresborough, a market town and parliamentary borough, 19 miles N.W. from York, with a station on the North-Eastern Railway, is picturesquely situated, as its name (*Knar*, 'a rock') implies, on the rocky bank of the swift Nidd, which here pours its waters between high wooded cliffs of limestone. The landscapes in the vicinity are remarkable for their wild beauty, and have derived an additional interest from their association with Lord Lytton's powerful romance of 'Eugene Aram,' The cave to which the name of that sentimental murderer is attached, lies on the E. bank of the river, about a mile below the town, and was formerly called St. Robert's, from a famous hermit who died about 1218. 'Blind Jack,' or John Metcalf, the great road maker, was a native of Knaresborough. The town, which originally grew up about the great castle founded soon after the conquest by Salo de Burgh, and now in a ruined condition, is well and neatly built, and contains a free grammar-school, some denominational chapels, and the usual local charities. There are two bridges across the Nidd, one of which leads to the famous *Dropping Well*, whose waters, being charged with carbonate of lime, produce various fantastic incrustations. The town depends for its prosperity on its limestone quarries, its linen factories, and its great corn-market. The church is ancient, with early English, decorated, and perpendicular portions. Knaresborough was plundered by the Scotch in May, 1318. It is a parliamentary borough, and formerly returned two members to Parliament, but it was deprived of one by the Reform Act of 1867. Population in 1861, 5402; in 1866, 5336.

Leeds. [LEEDS.]

Middlesborough. [MIDDLESBOROUGH.]

New Malton, a market town and parliamentary borough, 18 miles N.E. from York, is situated on the N.W. bank of the Derwent. Here is an important junction station on the North-Eastern Railway, with branches to Driffield and Thirsk. The town is, in effect, a combination of three distinct sections, Old and New Malton on the right, and Norton on the left bank of the Derwent. The situation is agreeable; the streets are neatly laid out, and contain some good houses. Malton was an important Roman station, and the centre of several great Roman roads. After the Conquest a castle was built here, which has entirely disappeared. It is now the centre of the corn trade of a wide district, and its market attracts a crowd of dealers from all parts of Yorkshire. The churches of New Malton (St. Michael's and St. Leonard's) are both uninteresting; the Priory church at Old Malton, now used as the parish church, formerly belonged to a rich Gilbertine priory, founded in 1150. There is an excellent grammar-school here. Near Norton is *Whitewall*, the famous training establishment for race horses of John Scott; and other trainers have stables on a smaller scale in the neighbourhood. The training-ground (about 250 acres) is on Langton Wold. The parliamentary borough formerly returned two members, but was deprived of one by the Reform Act of 1867. Its population in 1861 was 8072; in 1866, 8286.

Northallerton, a market town and parliamentary borough, 32 miles N.N.W. from York, with a station on the North-Eastern Railway, is situated on the Wiske, an affluent of the Swale, and consists chiefly of one long and wide street, with the parish church, a cruciform building with a central perpendicular tower, at the north end. The town occupies the site of a Roman encampment, of which some inconsiderable remains are extant. A castle, built here by the bishops of Durham, was razed to the ground by Henry II. A palace, occupied at different times by Edward II. and III., has also ceased to exist. The grammar-school, of great antiquity, has produced several eminent men; among others, Rymer, the editor of the 'Fœdera.' Races are held at Northallerton every October. The borough contains several public buildings, and the house of correction and registry office for the North Riding. The great 'Battle of the Standard,' in which the Scotch were totally defeated by the northern barons, was fought on a field 3 miles N. of this place, in 1138. Population of the town, 2970. The parliamentary borough returns one member: population in 1861, 4755; in 1866, 4639.

Pickering, a market town, 26 miles N.N.E. from York, with a station on the Great Northern line to Whitby, contains an ancient parish church, restored in 1861, and exhibiting Transition-Norman and decorated characteristics. On the brow of a hill at the west end of the town are the remains of Pickering castle, commanding a noble view over the finely-wooded country to the W. and S. The Mill tower, the Devil tower, Rosamond's tower, the Keep, portions of the inner court, and other ruins, are well worthy of the attention of the antiquarian. They belong apparently to the reign of Edward I. Richard II. was detained here a prisoner, before his removal to Pontefract. Pickering, which consists chiefly of one well-built street, contains some dissenting chapels. It has no manufactures, and the trade is inconsiderable. Population of the town, 2640; of the parish, 4501.

Pontefract, usually called *Pomfret*, a market town, and municipal and parliamentary borough, 24 miles S.S.W. from York, is situated on an eminence about 4 miles S.S.E. from the junction of the Calder with the Aire. It has a station on the Knottingley branch of the Great Northern Railway. Pontefract is a well-built town. Its market, begun in 1859, is a handsome building. The streets are spacious and clean, and the town contains a town-hall, free grammar-school, and two churches. The ruins of the celebrated castle are situated on a rocky eminence. Architecturally they are not important, but their historical associations are numerous. The castle was founded soon after the Conquest by Albert de Lacy, who held it until 1310,

when it passed to Thomas Plantagenet, earl of Lancaster, and afterwards to John of Gaunt. It was thrice besieged in the Civil War, and dismantled by order of Parliament. Here Thomas of Lancaster was beheaded in 1322; Richard II. starved to death in January, 1399–1400; James I. of Scotland imprisoned in 1405; and Earl Rivers and his chief associates beheaded in 1483. Liquorice is grown largely in the neighbourhood. The plant, which is very graceful, does not come to perfection until the third year. The municipal borough is governed by four aldermen (one of whom is mayor) and twelve councillors: population, 5346. The parliamentary borough returns two members; population in 1861, 14,736; in 1866, 11,848.

Richmond, a market town, and municipal and parliamentary borough, 44 miles N.W. from York, is romantically situated on the summit of a bold rocky eminence, at whose base flows the rapid Swale. Across the river is thrown a modern bridge of three arches, which leads to the railway station. The castle crowns the summit of a rock which overhangs a bend of the Swale; its stern, gray, and massive keep towering above a mass of inferior buildings. It was founded by Alan the Red, first earl of Richmond, immediately after the Conquest, but the keep was erected by the fifth earl, who was also duke of Brittany. It is 100 feet high, and the exterior walls are 11 feet thick. The view from the battlements is one of the very finest in England. 'On one side the eye ranges up the wide hollow of Swaledale, and on the other over the fertile plain of Mowbray, to the distant towers of York and to the estuary of the Tees. Far below the river foams and dashes over its rocky bed, through a grand broken foreground, with trees and hanging banks.' Robin Hood's Tower, the chapel of St. Nicholas, and the Castle Court present many points of interest. The parish church has been recently restored and rebuilt by Mr. G. G. Scott. The choir and tower are perpendicular, the rest decorated. The grammar-school was founded by Queen Elizabeth, but the school-house dates only from 1850. Trinity Church has been sadly desecrated. Of the old Franciscan priory only a perpendicular tower remains. The town, which is neatly built and enjoys a healthy air, contains several denominational chapels and charitable institutions. The municipal borough is governed by four aldermen (one of whom is mayor), and twelve councillors. Population, 4290. The parliamentary borough has returned only one member since the passing of the Reform Act of 1867. Population in 1861, 5134; in 1866, 5219.

Ripon, a market town, municipal and parliamentary borough, and the see of a bishop, 23 miles N.W. by W. from York, is situated near the W. side of the Ure, which is crossed by a handsome bridge. The streets are generally narrow, but paved and well built. The town contains a town-hall, theatre, free grammar-school, hospital of St. Mary, hospital of St. Anne, a market cross, and other public buildings. The cathedral, though small, is a structure of great beauty. It was commenced by Archbishop Roger in 1154–81; the west part was added by Archbishop Gray (1215–38); the eastern portion of the choir in 1288–1300; the perpendicular nave and the tower between 1450 and 1510. It was erected into a collegiate church, with a dean and six prebendaries, by James I., in 1604. In 1862 the building was restored by Mr. G. G. Scott. The west front is 103 feet high; the nave 87 feet wide. About 1 mile from the town is the episcopal palace, designed by Railton, and built in 1841; Studley Royal, the seat of Earl de Grey and Ripon; and the exquisite ruins of Fountains Abbey, once the richest Cistercian abbey in England. Ripon was much injured by the Scots in 1319, and by the parliamentary troops in 1643. It was formerly celebrated for its woollen cloth, but has now no manufactures and little trade. The bishopric of Ripon was created in 1836; the episcopal income 4500*l.* per annum. The municipal borough is governed by four aldermen (one of whom is mayor) and twelve councillors. The parliamentary borough formerly returned two members, but lost one by the Reform Act of 1867. The population within the municipal and parliamentary limits (which are co-extensive) was 1861, 6172; in 1866, 6219.

Rotherham, a market town, 6 miles N.E. from Sheffield, is situated at the confluence of the Rother with the Don. It is the terminus of the Sheffield and Rotherham Railway, and has a station on the Midland line. It trades in iron, coal, corn, horses, cattle, and sheep, and is one of the chief Yorkshire markets for the latter. Its perpendicular church is a magnificent edifice, built about 1480. The town, which is prosperous but murky, contains a grammar-school, market-place, denominational chapels, reading-room, almshouses, and other public buildings. The Don is crossed by a substantial bridge. Population of town, 7598; of parish, 24,003.

Scarborough. [SCARBOROUGH.]

Selby, a market town, 14 miles S. from York, and 8½ miles from Milford Junction, on the Great Northern Railway, is situated on the W. bank of the Ouse, over which there are two bridges. It is mostly well built. The parish church, formerly conventual, is an elegant and spacious structure 283 feet long, erected between 1096 and 1122, and enlarged at various periods. Of the Benedictine monastery, founded in 1069, the remains are few and unimportant. There is a free grammar-school. Trading vessels visit Selby from Hull and London, and there is also communication with Wakefield, Leeds, and York. The town has flax mills, rope works, and ship yards. Much building stone is exported. In the neighbourhood, besides great crops of corn, flax, and woad, teasels are largely grown. Population of the parish, 5424; of the town, 5271.

Sheffield. [SHEFFIELD.]

Shipley, a township and manufacturing settlement, on the Bradford Beck, is 15¾ miles from Skipton, and 11 miles from Leeds, by the Midland Railway. The whole valley is filled with mills and looms, water-wheels and engine chimneys; but the most interesting point is *Saltaire*, three-quarters of a mile distant, a new town on the river Aire, founded by Mr. Titus Salt in 1853. [BRADFORD.]

Skipton, a market town, 44 miles W. from York, and the capital of the mountainous district called Craven, is situated between the Wharfe and Aire, in the centre of a good grazing district. It consists principally of one long and picturesque street, at the head of which are the perpendicular church, partly restored in 1853, and the old castle, which consists of two portions; the round towers and connecting curtain dating from the time of Edward II., the inhabited portion from that of Henry VIII. It was formerly the seat of the great Clifford family. Skipton is famous for its cattle markets, held once a fortnight. It contains an excellent free grammar-school, a saline spring, pump-room, and baths, and some dissenting chapels. Lord St. Leonards is a native of this town. There are some important limestone quarries in the neighbourhood, whose produce is exported by the Leeds and Liverpool Canal. Population of the town, 4533; of the parish, 7734.

Snaith, a small and decaying market town, 23 miles S. by E. from York, stands on an eminence, on the S. bank of the Aire. Its church is early English and perpendicular. Population, 1763; of the parish, which includes the port of Goole, 12,772.

Tadcaster, a market town, 9 miles S.W. from York, stands on both sides of the Wharfe, which is here crossed by a stone bridge. It has a station on the North-Eastern Railway. The parish church is ancient and handsome. In the neighbourhood is Towton Field, famous for the great victory of Edward IV. over the Lancastrians, March 29, 1461. Population of the town, 2327; of the parish, 3126.

Thirsk, a market town and parliamentary borough, 23 miles N.W. by N. from York by the North-Eastern Railway, stands on a small stream in a fertile vale. It is a picturesquely situated town, with a large agricultural market, good inns, old houses, and a pleasant neighbourhood. There are no remains of the ancient castle of the Mowbrays; but the church, a splendid perpendicular structure, claims the attention of the archæologist. Its roof, of Irish oak, is enriched with superb carving. The tower is lofty and massive. There are three sedilia, and some good stained glass. Population of the township, 2956. The parliamentary borough returns one member: population in 1866, 5366.

Wakefield, a market town, and municipal and parliamentary borough, 29 miles S.W. from York, stands on the N.W. bank of the Calder, at the point where the Barnsley Canal enters it on the opposite side. It is connected by canal with Hull, and by railways with all the chief towns in Yorkshire. The town consists of several spacious and regular streets formed of good houses. The woollen and worsted manufactures, introduced early in the eighteenth century, and formerly very extensive here, have been to a considerable degree transferred to Halifax and Bradford. The chief manufactures now are iron and brass founding, and the making of steam-engines; malt-making, boat and sloop building, rope-making, and dyeing. There is a large agricultural trade in corn, wool, and cattle. The town contains a large house of correction for the West Riding, accommodating 2000 prisoners; extensive corn magazines, a lunatic asylum, a wharf, the West Riding proprietary school, a free grammar-school, a spacious corn exchange, enlarged in 1862; and a fine parish church, consecrated by Archbishop William de Melton in 1329. It was restored in 1861 by Mr. G. G. Scott. There are three other churches, and numerous dissenting chapels. The great battle of Wakefield was fought December 31, 1460. Among the eminent natives of the town have been Archbishop Potter, Dr. John Radcliffe, Dr. Burton, Joseph Bingham, and Robert Bentley. The municipal borough is divided into seven wards, and is governed by eight aldermen (one of whom is mayor) and twenty-four councillors. Population, 23,351. The parliamentary borough returns one member. Population in 1861, 23,150; in 1866, 23,717. The entire parish contains 35,739 inhabitants.

Weighton, or *Market Weighton*, a market town, 19 miles from York, and 17 miles from Selby by a branch of the North-Eastern Railway, is situated at the foot of the Wolds. A great sheep fair, at which 60,000 sheep are sometimes collected, is held here in September. A navigable canal, about 10 miles long, starts from a point near the town, and extends to the Humber, near Flaxfleet, draining the fens, and affording an easy mode of conveyance and transport. The church is without interest. Population, 2178; of the parish, 2589.

Wetherby, a small market town, on the Harrogate branch of the North-Eastern Railway, is situated in the valley of the Wharfe, 15 miles S.W. from York. The river is crossed here by a good bridge. The church is a plain, neat building. About 3 miles distant is the *Cowthorpe Oak*, supposed to be 1600 years old. It is 43 feet in height, and 36 feet 3 inches in girth, at 5 feet from the ground. Population, 1682.

Whitby (*i.e.*, the 'White dwelling'), a market town, parliamentary borough, and seaport, 60½ miles from York by the Great Northern Railway, is situated near the shore of the North Sea, on both banks of the Esk, which here flows through a narrow valley between lofty and steep cliffs. The river divides the town into two nearly equal parts—that on the N.W. bank being somewhat the larger and the better built; that on the S.E. the more ancient, with many of the houses rising above each other among the cliffs. The parish church, which formerly belonged to Whitby Abbey, stands on the summit of the S.E. cliff, and the ascent to it is by 194 stone steps. It contains some Norman portions. Adjoining are a few scattered remains of the once celebrated abbey, which was founded as a nunnery about 657, by Helda, a Northumbrian princess, and re-established after the Conquest by William de Perci, for Benedictine monks. There are three other churches in the town, several dissenting chapels, a museum and library, some good hotels, a grammar-school, dispensary, public baths, and various charities. The harbour is in the river, is provided with quays, and defended by two stone piers. The western one extends into the sea in a N.E. direction 2000 feet, with a lighthouse at its farther end. The eastern projects across the entrance of the harbour, so as to defend it from the violence of the waves. A bar at the mouth prevents large vessels from entering. The number of ships registered as belonging to the port in 1867 was 405 (75,515 tons). The entries in 1866 were 492 (26,226 tons), and the clearances 95 (4596 tons). The revenue derived from customs duties in 1867 was 3574*l*. Coals and alum are exported, and large quantities of articles worked in jet, for which Whitby is famous. The whale fishery is no longer a staple of the place, and the trade in shipbuilding has declined. Dr. Scoresby, celebrated as an Arctic explorer, was a native of Whitby. The population of the parliamentary borough in 1861 was 12,051; in 1866, 12,620. The parish has 14,014 inhabitants.

York. [YORK.]

History.—The early inhabitants of the county were included by the Romans under the general name of *Brigantes* (a word which has been explained as signifying 'highlanders,' or 'mountaineers'). They were not subdued until A.D. 78–79, when the work of conquest, begun by Petilius Cerealis, was completed by Agricola. Their territory was quickly covered with camps, and cities, and roads, and under the name of Valentia attained a remarkable condition of prosperity. York, 'Altera Roma,' was the imperial residence when Britain was visited by the emperors, and the head-quarters of the 6th legion, who thence despatched the troops necessary to garrison the advanced posts and the stations along the Great Wall.

When and how Valentia was converted into an Anglo-Saxon kingdom it is difficult to determine. We read of Ida as its sovereign in 547, and nearly a century later find Yorkshire the seat of the principality of Deira, extending from the Humber to the Tyne. York in 620 became the capital of the powerful kingdom of Northumbria. In the reign of Edwin Christianity was

introduced by the missionary, St. Paulinus. The Northumbrians increased in wealth and civilization for upwards of a century and a half, until the Danes (in 793) made their appearance on the Yorkshire coast, and commenced those terrible incursions which retarded the national progress for many generations. In 875, under the great 'viking' Halfdan, they established permanent colonies in Yorkshire, whose sites may still be recognized by the termination 'by,' or prefix 'kirk,' in the local names. Of the latter nineteen instances occur in the county.

The Danish kingdom of Northumbria was formed into an earldom by Canute, or Cnut, whose rulers were among the wealthiest and most powerful of the English nobles. Tostig, the brother of Harold, was earl of Northumbria under the Confessor. After the Conquest the country between the Humber and the Tyne became known by its present appellation, Yorkshire: it suffered awfully from the ravages committed by William and his soldiers in 1069–70, and for nine years was desolated by famine.

The county was afterwards divided into fiefs, held by the famous Norman families of Percy, Lacy, Mowbray, Clifford, and Scrope, who founded churches and established monasteries, after their usual fashion. Rievaulx, the first Cistercian house, was established in 1131. St. Mary's, at York, the Benedictines had previously restored. It was the wealthiest abbey in Yorkshire: second in importance came Fountains (Cistercian); third, Selby (Benedictine); and fourth, Guisborough (Augustinian). York was erected into a metropolitical see by Pope Gregory the Great. The first Norman archbishop was Thomas of Bayeux, consecrated in 1070. In the twelfth century the county was famous for the number of its rich monastic houses. The Cistercians counted nineteen; the Benedictines, sixteen; the Cluniacs, two; the Carthusians, two; the Augustinians, eleven; and other orders, thirty-five. The only mitred abbots were those of Selby and St. Mary's, York.

After the Conquest, the principal events in the history of Yorkshire are necessarily connected very closely with the history of the kingdom, and their importance and interest prevent us from dwelling upon them.

We can but refer to the Battle of the Standard, near Northallerton, in 1138, in which the Scotch were totally defeated; the Scotch invasion, in 1322, under the Black Douglas; the insurrection against Edward II. in the same year; the landing of Bolingbroke (Henry IV.) at Ravenspurne; the rising of Archbishop Scrope and the northern earls, put down so cruelly and effectually by Henry IV.; and the great battles of Wakefield and Towton in the wars of the Roses, the latter of which crushed for ever the hopes of the Lancastrians. In 1536 occurred the religious outbreak known as the 'Pilgrimage of Grace,' and in 1569, the rebellion against Queen Elizabeth, generally entitled the 'Rising of the North.' Both these events are very fully and satisfactorily described in the picturesque pages of Froude's 'History of England' (vols. iii. and iv.). During the Civil Wars the county was the theatre of frequent engagements between Royalists and Parliamentarians; its population, however, for the most part, sympathized with the Royal cause, which here received its first deadly blow on the well-fought field of Marston Moor (July 2, 1644), 'one of the two bloodiest (the other was Towton) ever fought on English ground and between Englishmen.' Yorkshire boasts of having possessed the two strongholds that held out last for Charles I.; Scarborough surrendered in December, 1648; and Pontefract, March, 1649. Of late years the county has played no unimportant, though, happily, a purely pacific part in the national history, as the seat of the woollen and worsted manufacture, which so largely contributes to our commercial prosperity.

Antiquities.—Almost every rood of ground in Yorkshire is rich in memorials of the past. These may be divided into British, Roman, Saxon, and Mediæval. Of the British the most remarkable are the primitive houses and villages on Danby Moor, in Harwood Dale, at Egton Grange, and other localities. The Devil's Arrows, near Boroughbridge, are curious monuments of stone. There are camps at Almondbury and Mexborough; earthworks at Flamborough and Catterick. The most valuable Roman remains are the multangular tower at York, and the relics of the ancient *Surium* (now Aldborough). A Roman bridge exists near Tadcaster (*Calcaria*).

Saxon architecture may be traced in the churches at Kirkdale, Hauxwall, Wensley, Ilkley, and Bedale; the finest Norman work at Campsall, Fishlake, Selby, Goodmanham, Lastingham, Hornby, Leathley, Coniston. The later architectural styles are exemplified in many beautiful churches and remains of monastic buildings scattered over the entire county. To some of these we have alluded in the preceding pages. Fuller particulars will be found in the county histories, in Murray's *Handbook*, and Walter White's *Month in Yorkshire*.

We can only allude to the following castles and manor houses—Scarborough, Pickering, Danby, Gilling, Helmsley, Middleham, Snape, Tanfield, Skipton, Spofforth, and Barnard castles; Woodsome, Howsham, Bowling, and Ledsham halls; Burton Agnes and Burton Constable. Castle Howard, and Duncombe Park, were designed by Vanbrugh.

YORKTOWN, an old village in Virginia, one of the United States of North America, 70 miles E.S.E. of Richmond, and 12 miles E. of Williamsburg, is only interesting as being the place where, on the 19th October, 1781, the British army, under Lord Cornwallis, surrendered to General Washington, which event terminated the revolutionary war.

YOUGHAL. [CORK.]

YPRES. [FLANDERS, WEST.]

YTTRIUM, a peculiar metal discovered by Gadolin in 1794, in a mineral pond at Ytterby in Sweden, whence it was called 'Yttria.' It was first obtained by Wöhler in 1828, and it exists in the minerals *gadolinite*, *tankelite*, *yttrocerite*, *yttrocolumbite*, and some others.

Oxide of Yttrium, or *Yttria*, is colourless, insipid, insoluble in water, and infusible; its specific gravity is 4·842; it is perfectly insoluble in the caustic alkalies. It has no action on vegetable colours.

YUCATAN. [MEXICO.]

YUCCA, a genus of plants belonging to the section *Asparageæ*, of the natural order *Liliaceæ*. *Y. gloriosa*, common Adam's Needle, grows on the shores of the Carolinas, where its panicle of elegant flowers attains a height of 10 or 12 feet. *Y. filamentosa*, Thready Adam's Needle, is found on the shores of Virginia and the Carolinas. The leaves, if treated like hemp and flax, afford a fibre which may be employed in the manufacture of cloth or cordage; and the macerated stems deposit a feculent matter, yielding a quantity of starch.

YULE, the old English name for Christmas, which appears to be of Celtic origin, and derived from *wyl* or *gwyl*, 'a holiday.' It has been ascribed by some writers to a supposed primitive word, as *volvo*, 'I turn' or 'wheel,' because the turning or revolution of the year takes place at the winter solstice.

YVETOT. [SEINE-INFÉRIEURE.]

Z, like Y, was only found in the later Roman alphabet [see X], from which it has been transferred to the alphabets of western Europe. In the Greek series of letters it occupied the seventh place, the sixth being the property of the subsequently disused Vau or F. The permutations to which Z is liable have all been anticipated in the other letters. [See D; G; I; J; S; T; Y.]

ZACHIM, a fixed oil expressed from the seeds of *Balanites Ægyptiaca*.

ZAFFRE, in Metallurgy, is a term applied to the residues obtained by roasting native arsenides of nickel and cobalt, with a small proportion of silicious sand. Without such addition the roasted ore is known as *zaffor*. If carbonate of potash be mixed with zaffre, and the whole fused, the result is a blue glass, which, when ground and levigated, yields the pigment known as *smalt blue*.

ZAFRAN, the Indian name for *Crocus sativus*, whence our English word 'saffron.'

ZAIRE, the largest river in Western Africa S. of the equator, is commonly called the *Congo*. Nothing certain is known of its upper course, but it is said by the natives to rise in a marsh about 2° 15′ N. lat., and 17° 30′ E. long. It has only been traced to the distance of 280 miles from its mouth. The river is there from 2 to 3 miles wide, and is shallow. It afterwards contracts, falls over ledges of rock, and below Lemboo Point, to which the tide ascends, becomes navigable, but is divided into two or three channels. Near 13° 20′ E. long. the whole body of water is united in one stream, and it becomes deep and rapid by the time it reaches the sea at Fathomless Point, in lat. 6° S., where it is 10 miles wide. The country of CONGO is described in the article under that heading.

ZAMBESI is the name of the principal river in eastern Africa, which has been rendered memorable by the discoveries of Dr. Livingstone. In the upper part of its course it is called the Leambye. Some of its sources are even yet very imperfectly known, but it flows first in a S.E. direction to some distance below the Victoria Falls; it then turns to the N.E., and afterwards runs direct E. to the Portuguese town of Tette. In this part of its course it varies in width from 500 yards to 2 miles. Below Tette it again assumes a S.E. direction, and about 100 miles from its mouth, in the Mozambique Channel, it receives the Shire on the N. The latter river rises in Lake Nyassa, and has also been fully explored by Dr. Livingstone. About 50 miles from the sea the Zambesi divides into several branches, and thus forms a delta which is very unhealthy, in consequence of its malarious exhalations. The principal mouths are the Quiliman and the Luabo, but many others are known to and used by the Portuguese slave-dealers, who are the scourge of the country. These mouths are, however, dangerous to inexperienced mariners. The Zambesi is navigable as far as Tette, though with difficulty in the dry season, as there are then some dangerous rapids in the Laputa mountains; but when the river is at its full, vessels glide over them with safety. The total length of the Zambesi cannot, of course, be accurately stated, but it is certainly not less than 1200 miles.

Probably the most striking feature of the river is the very extensive falls which occur, in apparently about the middle of its course, and which Dr. Livingstone (who named them the Victoria Falls) describes as being by far the most wonderful sight he ever witnessed in Africa. They are formed by a fissure in the hard basaltic rock, which at that point forms the bed of the stream. The opening is only from 80 to 100 yards wide, but about 400 feet in depth, or twice that of Niagara. Immediately above the falls the river is more than a mile broad, and as this vast body of water has to force its way through an aperture about one-twentieth of its width, and falls such an immense height, it produces on the mind an effect of wonder and amazement—almost of terror and awe. In the native language the falls are called *Monioa-tunya*, or 'The Smoke Sounding,' in consequence of the enormous quantity of vapour that arises from them, and which can be seen at a distance of 20 miles.

The explorations of Dr. Livingstone and others have proved that the basin of the Zambesi is exceedingly picturesque, and in many parts well-watered and fertile. In some parts there are large beds of coal, and gold is also found. Under proper management there is no doubt that good crops of cotton and all other tropical productions could be grown; but at present, although much of the country is and has been for centuries nominally under the sway of the Portuguese, slavery exists in its worst forms, and until it is abolished there can be no hope of any real improvement.

Full descriptions of the Zambesi river and territory are given in Dr. Livingstone's works—*Missionary Travels and Researches in South Africa*; and *Narrative of an Expedition to the Zambesi and its territories, in* 1858-64.

ZA'MORA, an ancient town of Leon, in Spain, and the capital of a province of the same name, is situated on the right bank of the Douro, 130 miles N.W. from Madrid on the railway to Vigo, and has about 10,000 inhabitants. It is separated from its suburbs by walls, in which there are eight gates. The streets are narrow, the houses lofty, and the general aspect of the town sombre. The churches, of which there are above twenty, and the town-house, are the finest buildings. There are some manufactures of hats, serges, gunpowder, and leather, and a trade in wine and corn. Zamora was of great importance, and very strongly fortified, in the time of the Moors. It derived its name from a word in their language signifying turquoise, large numbers of those precious stones having formerly been found in the neighbourhood. It was taken from the Moors in 748 by Alphonso the Catholic, but was recaptured by them in 985. Ferdinand the Great finally annexed it to Castile in 1093, and it was the seat of the Cortes in 1297 and 1302. The town was entered by the French in 1809; and although no resistance was offered by the inhabitants, they were treated in a most barbarous manner, neither age nor sex being any protection against the invaders.

orchards. In addition to the fisheries, great numbers of water-fowl and their eggs are taken on some of the island; There are manufactures of linen, woollen, and fine yarns, distilleries, breweries, salt-works, soap, vinegar, starch, and tobacco factories, tile and brick kilns, tanneries, and dockyards for shipbuilding. Many of the inhabitants are also engaged in rendering the large quantity of madder grown in the province suitable for commerce. A fine ship canal was opened in 1866 through South Beveland, which is also intersected by railways communicating with those on the mainland. The chief islands are Beveland and Walcheren. The former has been already described. [BEVELAND, *North and South.*] *Walcheren* is the most westerly land in Holland. It is of a compact circular shape, about 12 miles in length and 10 in breadth, having an area of 55,000 acres, and a population of 40,000. The surface is quite level; about half is meadow and the remainder rich arable land, in some parts finely wooded. The climate always exercises an unfavourable influence upon strangers, in consequence of its excessive dampness, although it is not very injurious to the natives. The island has good railway accommodation. In 1808 the water burst through the dykes, and committed great damage, the country in some places being submerged to a depth of 30 feet. There are only two large towns, FLUSHING and MIDDELBURG. The island of Walcheren is unhappily best known in England in consequence of the ill-conducted expedition, in 1809, under the earl of Chatham, which was one of the most disastrous military failures recorded in the history of Great Britain. The object was to take Antwerp, and weaken the French influence in Belgium, but much precious time was wasted in the reduction of Flushing, and in the meantime the French garrison was very considerably reinforced, while the English were carried off in hundreds by a malignant marsh fever and ague. The original idea of capturing Antwerp had to be abandoned, but it was thought advisable to retain possession of Walcheren so as to compel the French to maintain a large force in Belgium, and thus weaken their power in other countries. Accordingly 15,000 men were left for that purpose, but the epidemic continued its ravages; and those who survived had to be quickly withdrawn, many of them in such a state that their constitutions were shattered for life. Altogether, about 7000 soldiers perished.

Schouwen, in the N. of the province, is about 18 miles long and 5 wide, and is separated by the East Scheldt from North Beveland. In this island is the town of *Zierickzee*, with 8000 inhabitants, who are chiefly employed in fishing, taking the eggs of sea-fowl (which breed in large numbers on the S. coast), salt-refining, and drying madder. There are also some calico factories, breweries, saw and flour mills, and a little shipbuilding. Zierickzee is the oldest town in Zealand, and formerly belonged to the Hanseatic League. Its ancient walls have been levelled, planted with trees, and formed into public walks. *Duiveland* ('pigeon-island') is separated from Schouwen by a narrow strait named the Dyl. It is only 8 miles long and 5 wide. *Tholen* contains rather more than 30,000 acres of good land, and has a population of 14,000. The chief town is *Tholen*, which contains 2500 inhabitants. Immense quantities of madder and the finest flax are produced, and there are some manufactures of excellent thread. *Cadsand*, at the mouth of the West Scheldt, is a very small island, but has some rich pastures, and is famous for its cheese. The capital, *Cadsand*, is a mere village.

ZEALAND, NEW. [NEW ZEALAND.]

ZEBRA. [HORSE.]

ZEBRA WOOD, a beautiful fancy wood, obtained in Demerara from a tree called *Omphalobium Lamberti*, is much used for rich ornamental work by cabinet-makers.

ZECHSTEIN, in Geology, the German designation of the upper or calcareous strata of the Permian formation. The total thickness is about 90 to 100 feet. It consists of—*a*, a species of marl, frequently containing rolled fragments of dolomite, and gypseous crystals; *b*, a disagreeably pungent limestone, expressively named *Stinkstein*, of a dark brown or dull green colour; and *c*, an indurated cellular magnesian limestone, called *Rauwacke*. Copper ores of galena are sometimes found in the zechstein series of strata. It occurs in Thuringia, overlying the Kupfer-schiefer, and is named 'minestone,' because it must be cut through to get at the metalliferous beds beneath.

ZELAYA. [MEXICO.]

ZEMBLA, NOVA. [NOVA ZEMBLA.]

ZEMINDAR (*Zemind*, 'land'), a Persian word which literally signifies a landholder. In Hindustan a number of villages at one time formed a district; the head man of such a district was called a *Zemindar*, and the district itself a *Zemindari*. Superior to the zemindars were the *nabobs*, or provincial governors, and from these, on payment of a certain annual sum, the former received fiefs, which exempted their district from any further taxation. This annual sum was levied, with interest, by the zemindars from the *ryots*, or cultivators of the land, and formed the staple of the imperial revenue. The zemindars, in turn, had under them a class called *havildars*, who were the real collectors of the taxes imposed by the former. The system was productive of the worst oppression toward the poor ryots, especially when, in 1772, the government let out the zemindaries to the highest bidders. The zemindar bade a high amount with the idea of having a still larger sum collected by his subordinates; and these in their turn took care to add on a large percentage for themselves; so that the Hindu villager often suffered from the most unjust extortion. To a certain extent the same system is still carried out by the British government, especially in Bengal, though, of course, it is divested as far as possible of its oppressive tendencies.

ZENANA, or ZANANA, the apartments in Oriental mansions appropriated to the use of the women of a family.

ZEND-AVESTA. [ZOROASTER.]

ZENITH and NADIR are two Arabic terms, imported into Europe with astronomy, to signify the point of the heavens immediately above the spectator, and the opposite (invisible) point below him. The latter term, though still mentioned in books on the use of globes, is quite obsolete among astronomers: the former is very frequently employed.

ZEOLITE (Greek, ζέω, 'to boil'), the common name of a numerous group of minerals, which are so called from their melting before the blow-pipe. They are distinguished by always containing a large proportion of water, as much as from 5 to 10 per cent. They are, in fact, hydrated silicates of alkalies or alkaline earths, most of them containing alumina. In hydrochloric acid they form a precipitate of gelatinous silica. They usually occur in amygdaloidal cavities in the veins and fissures of volcanic rocks; generally in the form of crystals, and sometimes as foliated or radiated masses. They also occur in acicular fragments, and occasionally as an essential constituent of the rock wherein they are found.

for 25 miles, and connects it with those of Schwyz and St. Gall. There are, besides, the Griefensee, the Pfäffikersee, and several smaller lakes. The climate is mild, though subject to sudden changes. The soil is well cultivated, but is not fertile, and the corn raised is hardly sufficient for home consumption; potatoes and fruits are important crops; there are numerous orchards and vineyards; and the best wine is grown on the E. shore of the Lake of Zürich. The pastures on the sides of the hills are important: large numbers of cattle are kept, and the dairy produce forms a chief source of wealth to the agriculturist. Zürich is one of the most industrious cantons in Switzerland; the chief manufactures are cotton, silk, and ribbons; and most of the rural population are employed in silk and cotton spinning. Within the last few years the making of railway locomotives and other machinery has also been carried on with very great success. Many of the Zürich mechanics devote a portion of their time to agriculture, and are amongst the best educated workmen in the world. The population are Protestants: schools are numerous, and attendance is compulsory on children from six to twelve years of age. Zürich holds the first rank among the cantons of the Swiss Confederation. It is a democratic representative republic, governed by the Constitution of 1837, under which all adult citizens, over twenty years of age, are voters.

Zürich (the ancient *Turicum*), the capital of the canton, is situated at the north-west extremity of the Lake of Zürich, 63 miles E.N.E. from Bern, on the railway to St. Gall, in a valley hemmed in by high hills. It is divided by the Limmat into two nearly equal parts; of which the one on the right bank is called the Grosse Stadt, and the other the Kleine Stadt. They are connected by three fine bridges. The Grosse Stadt is built on the slope of a hill called the Zürichberg; the Kleine Stadt stands on more even ground between the Limmat and the Sihl, just above the confluence of these rivers. The whole town was formerly surrounded by ramparts and ditches, but the works were razed in 1833. The streets are mostly narrow and irregular, the houses high, massive, and ancient-looking. The cathedral is a fine old building of the eleventh century, in which Zuinglius preached for some years. The university, gymnasium, school of industry, and other educational establishments, enjoy a high reputation. There are also a botanic garden, a good library, and several useful museums, and the inhabitants are almost invariably well educated; so that the town is sometimes called the Athens of Switzerland. Coverdale's Bible, the first entire English version of the scriptures, is believed to have been printed at Zürich in 1535. The university library pos original MSS. of many of the early reformers, po of which have been published during the present ce The town library contains three Latin letters from Jane Grey to Bullinger. Lavater, the physiogn a native, was pastor of a church here for twenty- years. The Federal Diet holds its sittings at Z alternately with Bern and Luzern. [SWITZERL In the old arsenal are some ancient standard armour, and a cross-bow said to be the one used b when he cleft the apple from his son's head. Zü a thriving busy place. Its silk and cotton manufa and iron machinery works give employment to thousands of work-people in the town and neighbour The population is 19,758.

The only other town of importance is *Winte* pleasantly situated in a plain, surrounded by vine hills, 12 miles N.E. from Zürich. It is a regularly place, one of the handsomest and neatest in all Sw land, and has a population of 6000, who are act engaged in cotton-spinning, cotton-printing, dyeing the manufacture of machinery. The canton also several important villages, in nearly all of which m factures are more or less extensively carried on, and are now nearly all united by a good system of rai accommodation.

ZUTPHEN. [GUELDERLAND.]

ZWOLL. [OVERYSSEL.]

ZYGÆNA. 1. The name given to a genus of dopterous insects bearing a close resemblance to m though they fly in the bright sunshine. 2. The n of a genus of *Squalidæ*, or sharks. The *Zygæna garis*, or Hammer-headed Shark, is a native of Mediterranean and Southern seas. It is a most v cious animal. The sides of the head of the com zygæna are produced in a horizontal direction, assume the form of a hammer. Hence the vulgar n for this fish. The teeth, which are of the same sh in the lower and upper jaws, have their points direc towards the corner of the mouth. When young edges of the teeth are smooth. In the full-gr Zygæna they are distinctly serrated. There are f branchial, or breathing organs. The body is elongat covered with a skin slightly granulated: the colour grayish-brown above, and nearly white beneath. T Zygæna has been several times taken on the Brit coast.

ZYGOPHYLLA'CEÆ, a natural order of pla belonging to Lindley's Gynobasic group of Polypetal Exogens. In this order are included seventeen gen of which one of the most important is GUAIACUM.

THE END.

SUPPLEMENT.

ABEOKUTA.

TA, the capital of the province of Egba, om of Yoruba, on the western coast of ated about 250 miles west of the Niger, e plain, 567 feet above the sea level. It by a wall of baked mud and clay, from hes in circuit, between 5 and 6 feet in ierced at intervals with irregularly shaped The area occupied by the collection of fied with the name of a town, is 4 miles treets are narrow and dirty; there is no ansing, and but for the exertions of the the pig, fever would be perpetual. The uare, and built of mud, with high thatched certain radius round the town spreads a est, and on its outskirts are numerous several kinds of grain are produced in The palm is also cultivated, and palm-oil aple trade of the place. Population, be-0 and 150,000. (Captain Burton, *Abeo-Cameroons Mountains.* 1863.)

e name given to the parent of the human blical narrative, which has been embroidered and Mohammedans with numerous legend-According to the Talmud his first wife was nan of indescribable beauty, who became f the demons. She abandoned him, and s created. At their marriage the whole attended, served up a gorgeous banquet, ed the most delicious music. Their fall of innocency was accomplished by the guile Sammael. Adam, we are told, when first so tall that his crest touched the heavens, els were afraid of him; but to show his ness, God caused a profound sleep to fall nd deprived him of a part of every limb. reduced to a more moderate stature, though proportions were uninjured. It is said in hat through the evil agency of the angel s separated from Eve for 200 years, but tally met, and were reunited, on Mount r. Smith's *Dictionary of the Bible*, &c.)

ONE, THE (from two Greek words, signi-Abode of Love'), is an institution of a stic and religious character, established at near Bridgewater, Somersetshire, by Mr. Prince, formerly a clergyman of the Eng-

monites are called by themselves Lampeter d belong to a religious sect chiefly confined h-western counties, whose prophets and

AGAPEMONE, THE.

founders were Mr. Prince and another erratic clergyman, Mr. Starkey.

The latter was formerly curate in a Dorsetshire village, where his powers of eloquence attracted round him a large and admiring congregation, and where, at the outset of his labours, he appears to have effected no ordinary amount of good. But by degrees his doctrines changed, and in association with Mr. Prince, he began to promulgate the most extraordinary theories, which soon excited scandal and led to their dismission from the Church of England.

While their former hearers forsook them they continued, however, to gain proselytes; and a community of goods being one of the leading tenets of their new creed, many well-to-do farmers and tradesmen disposed of their property, and placed it at the disposal of Prince and Starkey. The former now took the lead in this strange society, and announced it to be his mission to redeem the body, as Christ had redeemed the soul. Of course he claimed for himself a direct inspiration from heaven, and declared that 'Jesus Christ had selected and appointed him to witness to his counsel and purpose, to conclude the day of grace and to introduce the day of judgment.'

In order to obtain funds sufficient for carrying out his designs, 'Brother Prince' persuaded three sisters, named Nottidge, possessed of considerable property, to take to themselves, as spiritual husbands, three of the leaders of the sect, namely, Prince himself, Thomas, and Cobb. A fourth sister afterwards followed their example. An Agapemone was then established at Weymouth. In this abode of love, however, perfect harmony did not prevail. In 1846 Mrs. Thomas having expressed her dissatisfaction with the moral code prevailing therein, which was eminently calculated to wound the feelings of a modest woman attached to her husband, was expelled from the society. She went to reside with her widowed mother, and gave birth to a son, whose custody was afterwards claimed by her husband. Mrs. Thomas resisted the claim, and in the course of the legal inquiry that ensued, the peculiar doctrines on marriage preached by the Agapemonite leaders aroused a wide-spread feeling of indignation.

The Abode of Love at Charlynch was established in 1859. It is a commodious building, surrounded by gardens, orchards, and fields of grain; is luxuriantly embellished and furnished, with a music-hall and a billiard-room, the latter being the 'sanctuary' of the sect.

A very graphic description of the mode of life of the Princeites, of their leaders, and their establishment, has

recently appeared in Mr. Hepworth Dixon's *Spiritual Wives* (1868), whence most of the foregoing details are borrowed.

ALGÆ, a natural order of plants belonging to the class *Cryptogamia* of Linnæus, and to the *Acotyledones* of the natural system, now generally adopted. About 2000 species are known and described, growing mostly in fresh or salt water, but also on the ground, in damp localities. They mostly abound in stagnant waters and warm climates. Their varieties of form, size, and structure, are infinite; some are of microscopic minuteness; others of gigantic proportions, measuring upwards of 1500 feet in length, and when seen floating on the ocean giving rise to the absurd traditions respecting the sea-serpent. They have no proper roots, merely processes by which they attach themselves to any object; and they wholly derive their nourishment from the medium which surrounds them, whether it be water or humid air. Their substance is gelatinous, and dissolves in water when they are boiled.

The order *Algæ* is divided into five sub-orders:—*Characeæ*, *Fucaceæ*, *Ceramiaceæ*, *Confervaceæ*, and *Diatomaceæ*.

ALMANAC. The principal almanacs now published in the United Kingdom are—'The Nautical Almanac,' an astronomical record, first published in 1767; the 'British Almanac,' dating from 1828; and the 'Englishman's Almanac,' issued by the Stationers' Company; these belong to England. Oliver and Boyd's 'Edinburgh Almanac,' first published under its present title in 1837, is the great Scotch authority, and contains a mass of valuable information on all public matters; and 'Thom's Irish Almanac' is the leading publication of the kind in Ireland. The principal Continental almanacs are the 'Almanach de Gotha,' begun in 1763, which has a world-wide fame; the French 'Almanach Impérial,' begun in 1769, under the title of 'Almanach Royale;' the Prussian 'Royal,' and the Belgian 'Royal Almanac.'

ALPES MARITIMES, or the Maritime Alps, one of the great divisions of the immense Alpine system of mountains, extending from the middle course of the river Durance southwards to the Mediterranean. Their culminating point is the Col Roburent, 9400 feet in height. They throw off numerous spurs and branches which strike towards the Rhône, and cover the French department of the Basses Alpes. Their grassy slopes afford admirable pasturage for cattle and sheep, and their valleys and glens are replete with all the elements of picturesque beauty.

ALTDORFER, ALBRECHT, a German painter and engraver, born at Altdorf, whence his name, in 1488; died at Ratisbon, 1538. He was a pupil, it is said, of Albert Durer, and the influence of that great master's style is visible in all his compositions, which are remarkable for their poetical spirit, their fidelity, tender feeling, and delicate execution. His master-piece, 'The Victory of Alexander over Darius,' is now preserved at Munich.

ALTERATIVES, in Medicine, a term applied to those remedies which effect a change in the condition of the living solids of the body, and consequently *alter* the functions these solids discharge. But, generally speaking, it is restricted to those drugs and potions which, if given in full doses, act as irritants, but administered on a gradual scale, gently alter the disordered secretions. Mercury in large doses is a powerful irritant, but small doses of grey powder, or blue pill, exhibited at intervals, and spread over a considerable period of time, are *alteratives*, restoring the liver to a healthy condition, and producing an improvement in the digestive functions.

ALTERED STRATA, in Geology, a term ap
those formations which, since their original cons
have undergone important changes through (pos
aqueous action. The term has become obsole
geologists now call them 'Metamorphic' or 'Tra
rocks.'

ANAM, or the ANAMESE EMPIRE, a po
dependency of China, in the eastern portion of Fu
India, including the kingdoms of Tonquin, Cam
and Cochin China. It extends between lat. 21°
29° N., and between long. 102° and 109° E. It
is upwards of 98,000 square miles, but its populat
computed not to exceed 5,000,000, of whom about
twelfth are Christians. Their language, which is mo
syllabic, bears a considerable resemblance to the Chi
and there is no doubt that they themselves are of Chi
descent. The climate is healthy and the soil fer
Agriculture, however, does not flourish—the popula
exhibiting strong maritime tastes, and displaying an
aptitude for navigation and great skill in shipbuild
There are some excellent harbours on the east. Sin
the reign of Louis XIV. the French have been activ
engaged in endeavouring to obtain a footing in t
country, and of late years they have succeeded
annexing a portion of Cochin China. They are n
however, with an obstinate resistance on the part of t
Anamese; and it cannot be said that their success h
been such as to repay them for the blood and trea
expended in the attempt.

Hué, the capital of Anam, is situated on a riv
the same number about 10 miles above its mouth.
contains an arsenal and building docks, and has be
strongly fortified under the direction of French engine
Kachar, in Tonquin, with a population of 100,00
said to be the largest town in the empire, and maint
an extensive commerce with China. Saigon is t
capital of the French territory of Basse Cochin-Chi
which is divided into six provinces, and comprises
area of upwards of 10,000 square miles. The cit
situated on the river Saigon, about 60 miles from i
sea, is well fortified, and contains an arsenal and a na
yard. The river is navigable up to the town for ve
of 1000 tons burthen. Saigon was captured by t
French in 1859.

ANAPA, a Russian seaport and fortified tow
Trans-Caucasia, or Abassia, on the north-east coast
the Black Sea, in lat. 44° 54' N., and long. 37° 2
The outer road is subject to frequent storms and t
port is only accessible for small vessels. The port
constructed in 1784 by the Turks, but captured by t
Russians in 1791. It was afterwards restored to Tur
but by treaty the Russians again acquired it, and
retain possession of it. The exports are wax, hid
honey, grain, and tallow. The population, consist
Russians, Circassians, Greeks, Jews, Armenians, &
number about 4000.

ANTIGONUS DOSON (Ἀντίγονος Δόσων), so
it is said, because he was always on the point of gi
but never gave, was the son of Olympias of Larissa
and Demetrius of Cyrene. On the death of Demetri
B.C. 229, Antigonus married his widow, and was ap
guardian of his son Philip, but almost immedia
assumed the crown of Macedonia in his own right.
reign, which lasted nine years, was marked by the
part which he took in the affairs of Greece. He
with Aratus and the Achæan league against Cleo
king of Sparta, and the Ætolians, and was
successful. He also won several victories over
Illyrians. He died B.C. 220, and was succeeded b

Philip V. (Plutarch, *Aratus*, and *Cleomenes*; Polybius, bk. ii., 45–70.)

APIS MUSCA, the Bee, or Fly, one of the southern constellations defined by Bayer, containing four stars.

APPROPRIATION CLAUSE, THE, a modification of the ecclesiastical system of Ireland, effected by an Act of Parliament passed in 1833, the 3 & 4 Will. IV. c. 37. It suppressed several Irish bishoprics, and applied their revenues to ecclesiastical purposes. The changes introduced were as follows:—The see of Dromore was united with that of Down and Connor, Raphoe with Derry, Clogher with Armagh, Elphin with Kilmore, Killala and Achonry with Tuam, Clonfert and Kilmacduagh with Killaloe and Kilfenora, Kildare with Dublin and Glandelagh, Ossory with Ferns and Leighlin, Waterford and Lismore with Cashel and Emly, Cork and Ross with Cloyne. The temporalities of the suppressed bishoprics were vested in the hands of four commissioners to be applied exclusively for the benefit of the Established Church of Ireland. We have used the popular term 'suppressed;' but it should be noted that these bishoprics were not *actually* suppressed. They did not cease to exist, but were simply united with other sees; just as if the bishop of London were charged with the administration of the bishopric of Winchester, without receiving the revenues of the latter, which should thenceforth be applied for the general benefit of the English church.

AQUA TOFANA, a once celebrated Italian poison, invented, it is said, by a woman of Palermo, named Tofana, who afterwards established herself at Naples, and there carried on for many years her abominable trade. The characteristics of the poison were its clearness, colourlessness, and freedom from taste or smell. Four or five drops produced death, which did not result immediately, but was preceded by long-continued debility, loathing of food, and incessant thirst. It is supposed to have been, in the main, a concentrated solution of arsenic.

The number of husbands dying suddenly, and from no apparent natural causes, in Rome, about 1659, attracted the attention of the papal authorities, and on inquiry a secret society of young married women was discovered, under the leadership of an aged woman named Spara, who had learned the art of poisoning from Tofana. Spara and four others were executed, but Tofana fled for refuge to a nunnery, where she remained in safety until 1709. She was then put to the torture, and confessed to have been instrumental in 600 murders. Her fate is involved in some obscurity. According to the generally received account she suffered death by strangling; other authorities assert that she was still living in prison in 1730. The former statement seems the more probable.

Much absurd fiction has gathered about the Aqua Tofana, whose apparently marvellous properties were in fact due to the then imperfect state of medical science. The poisoner, in those days, was more than a match for the physician; and his nefarious pursuit was furthered by the absence of any legalized mode of inquiry into the cause and nature of sudden or suspicious deaths.

ARAGO, DOMINIQUE, one of the most illustrious of modern French savants, was born at Estagel, near Perpignan, on the 28th of February, 1786. Having displayed at an early age indications of no ordinary capacity, he was sent in 1802 to the *École Polytechnique* of Paris, where his talent and industry soon gained distinction. His mathematical proficiency led to his appointment, in 1804, as secretary to the observatory, and two years later he was commissioned with Biot, the astronomer, to complete the measurement of an arc of the meridian, commenced some years previously by Delambre and Mechain. Their purpose was to extend it from Barcelona to the Balearic Islands. Before the work was completed, Biot returned to France. War between France and Spain then broke out, and the ambitious designs of Napoleon rendered the name of Frenchman a sound of abhorrence in Spanish ears. Arago was consequently involved in perilous embarrassments. He was denounced as a spy, and taking refuge in Majorca, only saved his life by voluntarily surrendering himself as a prisoner to the commander of the citadel of Palma. After awhile he was released, on condition that he proceeded to Algiers. Returning from Algiers to France he was captured by a Spanish cruiser; was sent to the galleys at Palamos; again liberated; and once more endeavouring to regain his native land, was driven back by a tempest to Algiers, treated as a slave, finally dismissed through the intervention of the French consul, and happily arrived at Marseilles in July, 1809.

Thenceforth his career was one of unremitting devotion to science for many years. His researches in magnetism led to the establishment of the principles of 'chromatic polarization;' he investigated with great success the undulatory theory of light; he discovered the development of magnetism by rotation; and treated astronomical themes with equal depth of thought and brilliancy of style. In 1816, in conjunction with Gay-Lussac, he founded the 'Annales de Chimie et de Physique.' In 1825 he was rewarded with the Copley gold medal of the Royal Society of London. In 1830 he was made perpetual secretary of the French Academy. He visited England in 1816 and 1834, and on each occasion was warmly received by the representatives of literature and science.

Arago was a warm advocate of republican principles. In 1830 he took a leading part in the French revolution, and in that of 1848 officiated as a minister of war and marine in the provisional government. After the *coup d'état* effected by the present emperor in 1852 he retired from public life. He died on the 3rd of October, 1853.

ARCHÆGOSAURUS (from ἀρχηγος, 'a chief,' or 'leader,' and σαῦρος, 'a lizard'), a remarkable fossil saurian reptile, discovered in the Carboniferous formation, which was so named by Goldfuss because it seems to have been the earliest type of reptilian life in the primeval world. It was first supposed to be a fish, and was described by Agassiz under the name of *Pygopterus lucius*. Its reptilian character, however, was satisfactorily established by Goldfuss in 1847. Professor Owen considers it to have been the connecting link between the reptile and the fish; occupying an intermediate position between the ganoid fishes on the one hand, and the labyrinthodont reptiles on the other. Its ribs were short and almost straight, round and slender in the middle, and at the ends flat and expanded. It had two pairs of limbs, each provided with four long slender fingers, that supported a longish narrow-pointed paddle, adapted for movement in the water.

ARCHONS. After the abolition of royalty at Athens, in 1044 B.C., the administration of the state was intrusted to the hands of elective magistrates, appointed for life, and named *Archons*, or rulers. The first who held the office was Medon, son of King Codrus, and his descendants continued to enjoy it until 714, when it was thrown open to all persons of noble birth. In 752 the term of office was limited to ten years. In 683 it was made annual, and in 477 thrown open to all citizens, without distinction of rank.

The *Archontics* were a sect of Gnostics, of the Syrian school, so named from the use they made of the term *Archon*, to designate the 'Demiurgos,' or creator and ruler of the visible world, whom they regarded as the representative of the highest God. (Neander, *History of the Church*; Bunsen, *Hippolytus and His Age*; Vaughan, *Half-hours with the Mystics*; and Grätz, *Gnosticismus und Judenthum*.)

ARCTIC VOYAGES. The search after a North-West Passage to India and China, through a supposed open sea encircling the North Pole, was one of the earliest consequences of the maritime spirit awakened in the sixteenth century by the discoveries of Columbus, Vasco da Gama, Diaz, and their immediate successors. The first Arctic voyage was that of Corte Real, a Portuguese, in 1500. Among his followers were Sir Hugh Willoughby, who sailed from the Thames on the 20th of May, 1553, and was frozen to death on the coast of Lapland; Sir Humphry Gilbert, in 1583, who was lost at sea; Sir Martin Frobisher, in 1576; John Davis, in 1585, who discovered the strait still bearing his name; Barantz, in 1594; Weymouth and Knight, in 1602. In 1610 Henry Hudson explored the bay or sea named after him, which had previously been discovered by Frobisher. He made four voyages, and in the last, after wintering on the coast, was thrown by his sailors into a boat, and left to perish. Then came Sir Thomas Button, in 1612; and, in 1616, William Baffin, who discovered Baffin's Bay. [NORTH-WEST PASSAGE.]

To particularize all the expeditions undertaken since his time, either to discover the North-West Passage or to explore the Polar regions, would occupy more space than we have at our disposal. The more important, however, are set forth in the following chronological table:—

Captain Middleton's,	1742
Moore's and Smith's,	1746
Hearne's overland expedition, which traced the course of the Hearne River,	1769
Captain Phipps (afterwards Lord Mulgrave),	1776
Captain Cooke, in the *Resolution* and *Discovery*, on the north-western coast of America,	1776
Mackenzie's land expedition, which discovered the mouth of Mackenzie River,	1789
Captain Duncan,	1790
Captain Vancouver, in the *Discovery*,	1795
Lieutenant Kotzebue's Russian expedition,	1815
Captain Buchan and Lieutenant Franklin, in the *Dorothea* and *Trent*,	1819–22
Captain (afterwards Sir James) and Lieutenant (afterwards Sir John) Parry, in the *Isabella* and *Alexander*,	1818
Lieutenants Parry and Lindon, in the *Hecla* and *Griper*,	1819–20
Captain Parry, in the *Hecla*,	1824
Captains Franklin and Lyon,	1826
Captain Parry, in the *Hecla*, reaches within 435 miles of the North Pole,	1827
Captain Sir James Ross discovered Boothia Felix, and the site of the magnetic pole, lat. 70° 5′ 17″ N., and 96° 46′ 45″ W. He spent three winters in the Polar regions, and after an absence of four years, returned to England, October 18,	1833
Captain Back traced the course of the Great Fish River,	1833
Captain Back explored the Wager River,	1836
Sir John Franklin, and Captains Crozier and Fitzjames, sailed from England in the *Erebus* and *Terror*,	May 24, 1845
Commander Collinson, in the *Enterprise*, and Commander (now Captain Sir Robert) M'Clure, in the *Investigator*, sailed in search of Sir John Franklin, January 20, 1850. The latter having reached a point near Barrow's Strait, where his ship was frozen, set out with a few men in his sledge, to prosecute his researches, and on October 20, reached Point Russell (N. lat. 73° 81′, and W. long. 114° 41′), where from a elevation of 600 feet he discovered Prince of Wales Strait, connecting the Atlantic and Pacific Oceans—thus solving a problem which had occupied the attention of generations. M'Clure returned to England in 1856; Collinson in	
An American expedition, in search of Franklin, was undertaken by Dr. Elisha Kane in	
Various British expeditions for the same purpose were fitted out between the years 1848 and 1859, when the eighteenth, under Captain (now Sir F.) M'Clintock, sailed from Aberdeen. On the 6th of May the relics of the Franklin expedition were discovered at Point Victory, near Cape Victoria. [FRANKLIN.]	

A French expedition to explore the open sea known to exist in the vicinity of the North Pole templated in the present year; and an English expedition has recently been urged upon the government by Captain Sherard Osborn, C.B., and leading members of the Royal Geographical Society.

ARK OF THE COVENANT, ARK OF JEHOVAH, or ARK OF THE TESTIMONY, the symbol of presence in the Jewish tabernacle as God of Israel of his covenant with his chosen people, is fully described in the 25th and 37th chapters of the book of Exodus. It was a chest of shittim wood (or wild olive), covered both within and without with gold, 3 feet 9 inches in length, and 2 feet 3 inches in height and breadth. The lid was a plate of solid gold, called the 'mercy seat' or 'propitiatory,' and above it were the 'cherubim,' made of gold, between which was the place of the 'Shekinah,' or revelation of the divine presence. The two 'tables of the law,' or stone tablets on which the Decalogue was inscribed, were preserved within the Ark; which, we may add, does not appear to have been brought back from Babylon after the captivity, and consequently never hallowed the second Temple.

ARNAUD, JACQUES LEROY DE ST., a French marshal of the second empire, was born at Paris on the 20th of August, 1801. Having displayed a strong predilection for a military life, he entered the army at an early age; but various circumstances tended to obstruct him in his chosen career, and it was not until 1831 that he obtained the rank of lieutenant. In 1837 he was promoted to a captaincy in the foreign legion, which was then serving in Algeria, and here he first attracted attention as a dashing and unscrupulous soldier, to whom the most desperate enterprises might safely be intrusted. For his bravery at the siege of Constantina he obtained the cross of the Legion of Honour. In 1840 he became a *chef de bataillon*; in 1844, a colonel. His success in a campaign against Bou-Muza and his Arabs, in 1845, a campaign in which he displayed untiring activity and great military resources, accompanied with a remorseless cruelty—procured him promotion to a commandership of the Legion of Honour. In 1847 he was raised to the rank of field-marshal, and intrusted with the direction of a strong division against the Kabyles, who

after a series of sanguinary engagements, he completely subdued. Returning to Paris in 1851, he attached himself to the fortunes of Louis Napoleon (then president), who was then in need of an unscrupulous military instrument to execute his contemplated *coup d'état*. He was therefore appointed general of the second division of the army of Paris, and afterwards minister of war, in which capacity he carried out the military details of the revolution that raised his master to the imperial throne. He was rewarded for his services with the command, in 1854, of the French forces destined to co-operate with the British in the Crimean expedition, and was present at the Battle of the Alma, on the 20th of September. He was then suffering from a painful and incurable disease, of which he died nine days after the victory. His character and career have been painted with a powerful pencil, but in sombre colours, by Mr. Kinglake, in his 'History of the War in the Crimea' (vols. i. and ii.).

ATÉLIERS NATIONAUX (*i.e.*, 'National Workshops'), certain public institutions organized in France at the Revolution of 1848, with the view of developing certain socialistic theories for the employment of the operative class. Their superintendence was intrusted, in February, 1848, to an official department, organized for the purpose, and named 'The Committee of the Government for the Workmen.' Their fundamental principle was, that all workmen were entitled to be provided by the state with the means of living, on a certain uniform scale; a principle which, if correct, might as justly be applied to professional occupations as to the mechanical. To the National Workshops consequently flocked thousands of operatives, deserting their former masters, and disorganizing trade, and the government soon found itself called upon to feed an army of dispirited and indolent men, who were wholly without any stimulus to labour. The experiment had to be abandoned, and the riots which ensued wrecked the French republic, and paved the way for the establishment of the imperial despotism.

ATMOSPHERE, CURRENTS OF THE. The atmospheric currents are produced by the changes in the aerial strata resulting from the constantly alternating influence of heat and cold. The molecules of air are incessantly shifting their positions, owing to a variety of causes, chief among which are the great oceanic currents, and the powerful attractive force of the sun, moon, and planets. These produce a change in the temperature or in the relative humidity of the atmosphere. The effect of heat is to rarefy and expand, to increase the bulk of air while it lessens its density. A heated stratum consequently rises and overflows cooler and denser strata, causing an upper outward current, while the cooler and denser strata flowing towards the void when the equilibrium has been destroyed by expansion, produce a lower inward current. The relative force of these currents, or winds, is due to the different degrees of energy with which their causes operate. They are of three classes: the permanent, the variable, and the periodical, and differ widely in intensity and velocity, from the gentle zephyr that moves at the rate of 1 mile an hour, and scarcely stirs the leaf, to the mighty hurricane, which attains the speed of 100 miles an hour, and overthrows the loftiest trees and solid masses of masonry. [METEOROLOGY; WINDS.]

AUCKLAND, GEORGE EDEN, EARL OF, Governor-general of India, was the son of William Eden, Lord Auckland, a friend of William Pitt. He was born August 25, 1784, and after the usual university education was called to the bar in 1809. He succeeded his father as Lord Auckland in 1814. In the House of Peers he distinguished himself by his steady advocacy of Whig principles, and his speeches, though deficient in grace of style, were marked by sound sense and liberal views. In November, 1833, he received the appointment of president of the Board of Trade in Earl Grey's administration. In July, 1834, he joined Lord Melbourne as first lord of the Admiralty; a post which he vacated in the following November. In 1835 he accepted the responsible office of governor-general of India, which he held until 1841; the close of his governor-generalship being unhappily clouded by the disastrous war with Afghanistan. In 1839 he was created Earl of Auckland. After his return to England he took no prominent part in political life, and he died unmarried on the 1st of January, 1847. The earldom then became extinct, but the barony devolved on his brother, the bishop of Bath and Wells. Some graphic sketches of events transpiring during the earl's term of Indian office will be found in his sister, the Hon. Miss Eden's, 'Up the Country.'

BANK NOTES, a legal tender, negotiable instead of bullion, and issued by banking establishments under certain restrictions. In the manufacture of these 'symbolic forms of currency' the great object is to produce an article not easily imitable to the forger, or whose forgery may readily be detected. This is secured in the Bank of England notes by the adoption of a peculiar kind of paper, by a characteristic mode of printing, and by a certain intricacy of design. Each note, moreover, is inscribed with a distinctive mark only known to the bank authorities. The printing adopted is the electrotype as applied to surface-printing by Mr. Smee in 1855. Various ingenious projects for the further improvement of the Bank of England notes have been put forward of late years, but the best precaution against forgery is obviously artistic execution and design. The more artistic our bank notes are rendered, the less possible does it become for the forger, with his imperfect appliances, to imitate them.

BANTENG (*Bos Banteng*), a species of ox, belonging to Java and Borneo, closely resembling in shape, colour, and horns the Indian *Gaur*. It is black, with white legs; the muzzle sharp, the limbs slender, the hair short and smooth, the back considerably arched immediately behind the neck, and there is no dewlap.

BARROW, SIR JOHN, Baronet, an eminent English traveller, was born on the 19th of June, 1764, at Drayleybeck, in Lancashire. His youth was studious, and he evinced an early bias for mathematical studies. His love of travelling was also conspicuous, and he was still young when he made a voyage to Greenland in a whaling-ship. We afterwards find him teaching mathematics in a Greenwich academy; and next visiting China as private secretary to the British ambassador, Lord Macartney. A quick and close observer, and an industrious student, he acquired during his residence in China a knowledge of the Chinese language, and an acquaintance with Chinese civilization which rendered peculiarly valuable his 'Travels in China,' published at London in 1804. Still acting as private secretary to Lord Macartney, he accompanied him to the Cape of Good Hope, and his explorations of the interior are faithfully and graphically described in his 'Travels in the Interior of Southern Africa.' In 1804, on his return to England, Barrow was appointed secretary to the Admiralty, and this important post he held, with the exception of a brief interval in 1806, until 1845.

During this period he contributed largely to the *Quarterly Review*, the *Journal of the Royal Geographical Society*, which he originated and actively supported, and other periodicals; besides publishing 'A Voyage to Cochin China' (1806); 'Life of Lord Macartney' (1807); 'Chronological History of Voyages into the Arctic Regions;' 'Lives of Naval Worthies in the Reign of Elizabeth;' and 'An Autobiographical Memoir' (1847). He was honoured with a baronetcy, which his services had fully merited, in 1835. He died at London on the 23rd of November, 1848.

BARTON, BERNARD, a popular and amiable English poet, was born in London on the 31st of January, 1784. His parents belonged to the Society of Friends, and their son remained faithful to the principles of that peculiar sect. His life was singularly uneventful. In 1810 he was appointed clerk in a banking establishment at Woodbridge, Suffolk, and he continued in this situation until 1847, when he retired upon a pension of 100*l.* per annum. His first volume of poetry was published in 1812, under the title of 'Metrical Effusions.' It was followed by 'Poems, by an Amateur,' in 1818; 'Poems,' in 1820; and by other volumes at irregular intervals, of which the best known are 'Napoleon,' 'The Widow's Tale,' 'The Reliquary,' and 'Household Verses.' The staple of all these poems, as an eminent writer has observed, is description and meditation—description of quiet home scenery, sweetly and feelingly wrought out; and meditation, overshaded with tenderness and exalted by devotion; but all terminating in soothing and even cheerful views of the condition and prospects of mortality. The *vivida vis* of genius, however, is wanting in Barton's poems, and already they are nearly forgotten. The amiable and estimable poet died on the 19th of February, 1849.

BEREANS, a Calvinistic sect, which has now but few disciples, founded in Scotland by the Rev. John Barclay, of Perthshire, about 1770. Its members are sometimes styled Barclayans. They took the name of Bereans in allusion to the inhabitants of Berea, who 'received the word with all readiness of mind, and searched the scriptures daily' (Acts xvii. 11). The leading tenets of their faith would seem to be, that our knowledge of God is wholly and only derivable from scripture; that want of faith is the sin against the Holy Ghost which we are told is 'unpardonable;' and that David's psalms relate entirely and exclusively to Christ.

BOOKS. The word 'book' is from the Anglo-Saxon *boc*, which comes from the same root as *buch*, and is akin to the Dutch *boek* and German *buch*. The Latin word *liber* refers to the cellular texture of the papyrus, and the Greek βιβλος (*biblos*) to the Egyptian name of that once famous plant. From the Latin *liber* comes the English *library;* from the Greek βιβλος, βιβλιοθηκη, the French *bibliothèque*.

The Roman books, as the reader knows, were composed of long strips of papyrus wound round small cylinders, or *volumina;* whence our English word 'volume.' The vellum was inscribed with a reed pen, *calamus*, dipped in ink, *atramentum*, remarkable for its permanency of colour. In the Middle Ages the rolls were done away with, and leaves of parchment, made from the skins of sheep, goats, deer, and other animals, were sewn together, and inclosed between stout wooden boards. These boards were frequently covered with velvet or precious leather, and enriched with jewels, and emblematic decorations in gold and silver. The use of paper, though the manufacture of it was known as early as the ninth century, recommended itself to the old book-makers and transcribers very slowly was necessarily rendered general by the invention printing.

The size and form of printed books are now mined by the size and form of the sheets of composing them. A sheet once folded makes leaves or four pages: this is called folio. Fold th again, and it becomes a quarto (4to)—four le eight pages; fold it into eight leaves, or sixteen and it is called octavo (8vo); into twelve le twenty-four pages, and it is called a duodecimo (There are also 16mo, 24mo, 36mo, &c. But sheet of paper is also made of various sizes, th of books have got another signification, such a octavo, crown octavo, foolscap octavo, and th that is, an octavo made up from a demy, cr foolscap sheet of paper.

BRACES OF A SHIP. The spars attache yard-arms, for the purpose of shifting the sa zontally round the mast, that their surface may exposed to the wind according to the direction in it is blowing.

BRUNEL, SIR MARK ISAMBARD, an engineer, was the son of a French farmer, and Hacqueville, near Rouen, April 25, 1769. H bias for the mechanical sciences was very pron but family circumstances seem to have diverted first from the career for which he was specially and in 1786 he entered the naval service. H suspicion in 1793 by his royalist principles he e to the United States, and abandoning a milit commenced his great engineering works by the c tion of the canal between the river Hudson a Erie. Returning to England in 1799, he mar daughter of Mr. William Kingdom, of Plymo thenceforth settled in this country. He first a public reputation by the ingenious block machinery which he designed for the governm which is still in use at Portsmouth dockyard. afterwards employed in designing many of t important additions to our naval arsenals an military depôts, and in 1825 crowned his fam engineer by the bold project of a tunnel un Thames, from Rotherhithe to Bermondsey. T and difficult work was commenced in March, 18 finally opened to the public in March, 1843. execution was retarded by numerous obstacles, whic forth all Brunel's resources to conquer, and taxe utmost his skill, energy, and perseverance.

His active and ingenious mind was continua ployed in experiment and research, and many mechanical contrivances owe their existence laborious fertility.

Brunel was elected a fellow of the Royal So 1814, and appointed vice-president in 183 received the honour of knighthood in 1841. He his active and honourable career in December, 1 the ripe old age of eighty-one.

BRYOZOA, or POLYZOA, a sub-class of *R* now included by many naturalists in the sub-kl *Mollusca*. The species are in several respects a those of the class *Tunicata*. They are compoun mals, and the growth formed by the desiccated a is called a 'polyzoary.' They possess digestive, latory, and respiratory organs; a muscular and n system; and in an embryonic state are furnishe organs of motion. Their reproduction is effec gemination, by ova, and by what has been call locomotive embryos.

They have been arranged into two orders—the *Infundibulata*, or those which have the tentacles arranged in a ring round the unarmed mouth; and the *Hippocrepia*, which have the tentacles disposed in a crescent or horse-shoe shape round the mouth.

BUGEAUD, MARSHAL, Duke of Isly, a distinguished French general, was born at Limoges, in France, on the 15th of October, 1784. Having a strong passion for a military life, he entered the army as a private in his twentieth year, during the great wars of Napoleon, and when the emperor was at the zenith of his fame and power. In those days promotion was rapid, and *la carrière était ouverte aux talens*, a marshal's baton lying, it was said, in every private's knapsack. Bugeaud's gallantry and zeal in the campaigns of 1805–12 were rewarded by rapid advancement, and in 1813 he was appointed to a colonelcy. During the Hundred Days he was selected to command the advanced guard of the army corps of the Alps. After Napoleon's second abdication he withdrew from public life, and lived in retirement on his estates. The revolution of 1830 drew him from his seclusion. He was elected deputy for Perigueux, and in this capacity his masterly knowledge of military affairs, his ability, and moderation attracted the notice and secured the regard of Louis Philippe. Having risen through various grades in the army, he was specially honoured with a marshal's baton, and in December, 1840, appointed to the governor-generalship of Algiers. Here in a series of brilliant operations he completely crushed the resistance of the Arab tribes. None can deny his skill and perseverance; but it is to be regretted that the acts of cruelty which he sanctioned should have left a dark and indelible shadow on his fame. It was Bugeaud, however, who organized the celebrated irregular corps of *enfans perdus* and desperate adventurers known as the Zouaves. In 1844 he defeated the emperor of Morocco's forces at Isly, and was rewarded for his services with a dukedom. Recalled to France he received the command of the army of Paris, and had Louis Philippe followed his counsel in the revolution of February, 1848, and authorized the vigorous measures of repression which he suggested, it is not impossible that his dynasty might have been preserved. A determined enemy to republicanism, he willingly supported the present emperor of the French after his election to the presidency; for to Bugeaud a strong government, only slightly tinged with constitutionalism, seems to have been the ideal of statesmanship. The truth is, he was no politician. Bred up in camps, he was heart and soul a soldier, and his military capacity, it must be owned, was of a very high order. Bugeaud was appointed to the command of the Alps by Louis Napoleon, but held the post only a brief period, dying of cholera in Paris, on the 9th of June, 1849, in his sixty-fifth year.

BURMAH, BRITISH, the collective name of certain provinces which have been conquered by British arms from the empire of Burmah, or Ava, and annexed to our Indian territories. The provinces are:—

	Square Miles.		Population.
Arracan, . . .	10,700	...	375,000
Martaban, . . .	3,800	...	85,000
Pegu, ...	32,500	...	620,000
Tenasserim, . .	30,000	...	250,000

British Burmah stretches along the eastern coast of the Bay of Bengal for a direct distance of about 700 miles, with a very limited breadth. It is a flat alluvial district, producing large quantities of rice, in many places luxuriantly wooded, and well watered by the numerous streams which flow from the mountains lying at no great distance in the interior.

The Tenasserim provinces (Maulmein, Mergui, and Tavoy) were ceded to Great Britain by the treaty of Yandabu, February, 1826; Pegu and Martaban were annexed after the war of 1852.

The principal towns are:—

Rangoon, near the mouth of the eastern branch of the Irrawaddy, the centre of a considerable and constantly increasing trade. It possesses a dockyard, an arsenal, a river flotilla, quays, warehouses, an English church, and is strongly fortified.

Maulmein, or *Moulmein*, near the mouth of the Salwyn, is a rapidly rising seaport of comparatively recent growth. It contains 18,000 to 20,000 inhabitants, though its area, previous to 1826, was wholly covered with teak forests and jungle. Good coal is found in its vicinity.

Prome, on the Irrawaddy, a town of 35,000 inhabitants, is the largest and most prosperous in British Burmah. It carries on an extensive trade in rice.

Akyab, the chief port of the province of Arracan, and the local capital, is situated on a low island near the mouth of the river Arracan.

Off the coast of British Burmah lie the *Andaman Islands*, now occupied as a penal settlement, established in 1857. The chief town is named *Port Blair*, whither the Indian government despatches all prisoners and criminals sentenced to transportation. The captured Sepoys implicated in the Indian mutiny were confined here.

CARLISLE, GEORGE WILLIAM FREDERICK HOWARD, EARL OF, K.G., was born on the 18th of April, 1802. He received his early education at Eton, whence he was removed to Oxford in 1818. Here he distinguished himself by the extent and solidity of his acquirements, his perseverance, and brilliant talents. In 1821 he carried off both the Chancellor and the Newdegate prizes for the best Latin and best English poem, respectively. Crowned with the halo of university success he entered public life in 1826, as an attaché; and in 1830, in conjunction with Lord Brougham, contested the West Riding of Yorkshire on liberal principles, and, after a severe contest, was triumphantly elected. He continued to represent this important constituency for ten years, and though he never obtained an influential position in the House of Commons, he was respected for his consistency, and admired for the elegance and good sense of his occasional addresses, in which the influence of a highly cultivated mind was always conspicuous.

From 1835 to 1841 he held the post of chief secretary for Ireland, and his courteous manners, impartiality, and evident interest in Irish prosperity, gained him a wide and permanent popularity.

In 1841 he failed to obtain re-election for the West Riding; but five years later the electors repented of their ingratitude, and returned him at the head of the poll. In 1848 the death of his father (a kinsman of Lord Byron, who has paid him no very flattering tribute in his earlier poems) called him to the House of Lords.

In Lord John (now Earl) Russell's administration the earl occupied the post of chief commissioner of Woods and Forests; from which he was removed to the chancellorship of the Duchy of Lancaster—in both offices increasing the respect and esteem in which he was held by men of both political parties. In 1855 he was made Lord Lieutenant of Ireland, and this dignified post he

held, with the exception of a brief interval in 1858–59, until shortly before his lamented death, which took place on the 5th of December, 1865.

Lord Carlisle was distinguished throughout his career by his love of letters and his liberal patronage of literary men. His addresses and speeches were always felicitously expressed, and the merits of his 'Lectures on Pope' and his 'Diary in Turkish and Greek Waters, rise considerably above mediocrity. He was never married, and in his titles and estates was succeeded by his younger brother.

CONFEDERATE STATES OF AMERICA, the title assumed by those southern states which seceded from the American union in 1860. The causes of this great disruption are explained in our sketch of the history of the UNITED STATES. The principal motive was, undoubtedly, the desire of the 'Southerners' for the extension of slavery, which they believed to be indispensable to their influence, wealth, and prosperity, and the determination of a strong body in the North that so foul a blot should no longer rest on the name and fame of the great American republic. A struggle pending for many years was brought to an issue by the election of the abolitionist or republican candidate for the presidency, Abraham Lincoln, November 4, 1860. On the 20th of the following December, South Carolina, by a formal vote of the legislature, seceded from the Union. She was followed, early in 1861, by Alabama, Florida, Mississippi, Georgia, Louisiana, Texas, Virginia (except West Virginia), Arkansas, Tennessee, and North Carolina. The seceding states formed themselves into a confederacy, elected a House of Congress, appointed Jefferson Davis their president (February 18, 1861), and prepared to resist by force the attempts of the North to cement the disrupted Union.

The terrible and desolating war which succeeded will still be familiar in all its leading incidents to the reader. At first fortune seemed to smile on the Confederates, but they were unable to cope with the vast and almost inexhaustible resources of the North. As their armies melted away in successive battle-fields they were unable to replenish the weakened ranks; and at length the downfall of the Confederacy, after a struggle which was heroic if mistaken, was sealed by the surrender of General Robert Lee and the capture of Richmond, April 2–9, 1865. [UNITED STATES.] This exhausting war has, however, dealt a blow to the prosperity of the South, all whose fatal consequences can scarcely yet be estimated; and the great problem which now taxes the energies of American administrators is the reconstruction of its government and polity on an equitable basis.

FARADAY, MICHAEL, F.R.S., an illustrious English chemist and naturalist philosopher, was born in the parish of Newington, Surrey, on the 22nd of September, 1791. His father was a working smith, and Faraday's education was necessarily of the most rudimentary description. At the age of thirteen he was apprenticed to a bookbinder, and in this position he greedily devoured all the books that fell into his hands, but especially those of a scientific cast. These he mastered so thoroughly that he contrived to construct some simple apparatus, and make a variety of interesting electrical experiments.

Having been enabled through the kindness of a Mr. Dance to attend some lectures delivered at the Royal Institution in 1812 by Sir Humphrey Davy, Faraday took some careful notes of them, and rewriting [illegible] notes, with illustrative drawings, he ventured to send them to the great chemist. Davy discerned the young man's ability, and in the following year procured him an appointment as chemical assistant at the Royal Institution. Faraday joyfully accepted it, and removed to the Institution, where he continued to reside, with the exception of a short interval, until his death.

The record of a philosopher's life is generally uneventful. Of Faraday nothing more can be said than that his services to science were of the most important description, while his character as a man was absolutely without spot or stain. He was a devout Christian, belonging to one of the strictest Nonconformist sects, and an unassuming, charitable, genial, and honourable English gentleman. Few men have made more friends, notwithstanding his modest and reserved disposition, and it may be doubted whether he ever had an enemy.

His principal scientific labours may be briefly enumerated. In 1820 he discovered the chlorides of carbon, and in 1821 the mutual rotation of a magnetic pole and an electric current. Various successful experiments on the condensation of gases distinguished the year 1823. He began his experimental researches in electricity in 1831, and continued them, it may be said without exaggeration, until the end of his life; and so important were the results attained that his name will be associated with electricity as indissolubly as that of Newton with gravitation.

In 1846 he received the Royal and the Rumford medals for his remarkable discoveries in dia-magnetism and his researches into the influence of magnetism upon light.

In 1827 he began a series of lectures on scientific subjects at the Royal Institution, Albemarle Street, which he continued yearly up to 1867, and which invariably attracted the most distinguished audiences. His powers as a lecturer have rarely been equalled. He had the gift of explaining the most obscure theories in lucid and intelligible language; his illustrations were happy; and his faculty of comparison and analysis charmed and delighted his auditors. He was not less successful as an operator; the most delicate experiments being always performed with unerring certainty and brilliant facility.

In 1833 Faraday was appointed professor of chemistry at the Royal Institution. Two years later, at the instance of Lord Melbourne, he received from the Crown a well-merited pension of 300*l.* per annum. In 1836 he was appointed scientific adviser on lights to the Trinity House, and afterwards to the Board of Trade. He was chosen a corresponding member of the Academy of Sciences at Paris as far back as 1823. In 1824 he was elected a fellow of the Royal Society, and in 1832 the University of Oxford conferred upon him the degree of D.C.L. He was also one of the eight foreign associates of the Imperial Academy of Sciences at Paris, commander of the Legion of Honour, knight of the Prussian Order of Merit, knight of the Italian Order of St. Maurice and Lazarus, and a member of numerous scientific and learned bodies in Great Britain, France, Prussia, and the United States of America.

Professor Faraday closed his long, laborious, and useful career on the 25th of August, 1867. A sketch of his scientific career has recently (March, 1868) been published by Professor Tyndall.

GLASGOW: PRINTED BY WILLIAM MACKENZIE, 45 & 47 HOWARD STREET.